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THE CONDUCT AND VALUE OF SCHICK TESTING AND ACTIVE IMMUNIZATION AGAINST DIPHTHERIA DURING AN OUTBREAK.

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Introductory.

BETWEEN April and October, 1932, in Port Pirie, South Australia, there occurred 80 cases of diphtheria. In Port Pirie, in a population of 12,000 persons, over the previous eight years there were only 48 cases of diphtheria reported, so that when, by the end of June, 1932, 41 cases had occurred, it was apparent that an epidemic was imminent, defying the ordinary public health measures of isolation of patients and contacts, the swabbing of the latter, the isolation of carriers, and the disinfection of premises. In consultation with the Health Officer of the Local Board of Health, I suggested extensive Schick testing and active immunization of case contacts among whom cases were occurring, and of the children of the two schools at which most of the cases were occurring, and offered to perform the actual testing and immunizing at the laboratory, with the administrative aid of the health officer.

Propaganda.

Small leaflets were printed, on which were explained briefly the nature of the Schick test and of active immunization, and the safety and value of each. On each leaflet was an allotted ruled space on which the name of the child could be written, with the parent's signature, giving consent to the immunization if it was so desired. Of a total of 977 scholars at the school where most cases were occurring, 633 (64·8%) obtained parents' consent. Almost 100% of case contacts presented themselves

for testing and immunizing. This high percentage of volunteers contrasts with the low percentage in similar campaigns conducted in interepidemic periods, when the danger of diphtheria appears remote and 25% of volunteers is considered high.

Several favourable reports in the local Press also aided the success of the campaign.

Technique of Schick Tests.

Because of the extent of the testing and immunizing necessary, if it were to be effective in checking the outbreak, it was decided to dispense with the control test of heated toxin, and a single test only was used, the Commonwealth Serum Laboratories' diphtheria toxin for Schick test being diluted under aseptic conditions, such that the skin test dose was contained in 0·2 cubic centimetre. This was injected into the skin of the left forearm (intradermally) and the result of the test was read as described in the leaflet accompanying the toxin. ("A reaction appears as an area of redness and infiltration from 1 to 3 cms. diameter. It appears within 24 hours and develops to its maximum in the fourth day and may persist for 7 to 10 days or in some cases even for 15. It is followed by a local superficial scaling and pigmentation. Pseudo-reactions may arise, but are less sharply defined. They disappear within 48 hours and are never followed by scaling.")

Unless there was any urgency (as with case contacts, whose reactions could be read in twenty-four to forty-eight hours), readings taken about the fourth to fifth day were found to be best, as then pseudo-reactions had faded and the false element in combined pseudo-reactions and positive reactions had disappeared. Sometimes readings up to seven to ten days were necessary.

Results of Schick Tests.

The results obtained are embraced in Table I.

The accuracy of the Schick test in distinguishing immune from susceptible persons was shown in the development of clinical diphtheria in seven persons who reacted to the Schick test, before immunization had been performed (except one who had had immunizing injections, but whose immunity was apparently not complete), but no person who did not react to the Schick test developed diphtheria, though subjected to the same exposure to infection. Also three of the latter became carriers of virulent diphtheria bacilli without the supervention of clinical diphtheria.

Technique of Immunization with Anatoxin.

It had been decided to use anatoxin rather than toxin-antitoxin mixture for immunizing, because of its greater safety and its known equal efficiency. The Commonwealth Serum Laboratories' product, "Anatoxin (Diphtheria Prophylactic)" was used, following its recommended dosage of two subcutaneous injections of 0·5 cubic centimetre and 1·0 cubic centimetre at three weeks' interval, preceded by a skin sensitivity test. The latter comprised the intradermal injection of 0·1 cubic centimetre of anatoxin diluted one in twenty (provided ready for use with the anatoxin).

As recommended, an area of redness, with or without induration, of more than 1·25 centimetres (half an inch) diameter was taken to indicate sensitiveness. This reading was easier on the second day, when the transient flushes of the first day in delicate skins had disappeared. Induration was almost invariably present in sensitive cases. Persons with reactions less than or just 1·25 centimetres in diameter, with only slight induration, were found to be able to take almost the full 0·5 cubic centimetre immunizing dose. The average sensitive reaction of serious import was 1·8 to 2·5 centimetres (three-quarters to one inch) in diameter, with induration. Some were 5·0 centimetres (two inches) in diameter, and an occasional one 7·5 centimetres (three inches) or more.

The sensitivity to anatoxin varied directly as the age, and it was noticeable that the very young children showed practically no sensitive reactions, a few showing the bare 1·25 centimetre (half inch) reaction.

As all grades of reaction were found from the mere needle mark to an area of redness and œdema extending for 10·0 to 15·0 centimetres (four to six inches) and all intermediate dimensions, it was rather difficult to classify the reactions, and judgement was exercised in gauging the size of the dosage for immunizing. Thus initial doses of from 0·1 to 0·3 or even 0·4 cubic centimetre were given in cases with a 1·25 centimetre (half inch) reaction without ill effects. Persons with 1·8 centimetre (three-quarter inch) reaction or more were never given more than 0·01 cubic centimetre, and the reaction to this was found to be proportional to the original skin test reaction. Usually no reaction, or only slight tenderness, perhaps with slight redness, occurred in the cases with 1·25 to 2·5 centimetre (half to one inch) skin reaction, but those with the more severe skin reaction (over 2·5 centi-

TABLE I.

Summary of Schick Testing of School Children and Others.

School.	Total Scholars.	Total Volunteers.	Percentage Volunteers.	Positive Reactions.	Percentage Positive Reactions.	No Reactions.	Percentage No Reactions.	Average Age.
Pirie West	977	633	64·8	267	42·2	366	57·8	8·7
St. Mark's	241	98	40·7	48	49·0	50	51·0	9·5
Contacts et cetera (ages 60 to 1 year)	—	171	—	92	53·8	79	46·2	12·9
Totals	—	902	60·0	407	45·1	495	54·9	9·6

metre diameter), even with only 0·01 cubic centimetre immunizing dose, showed a reaction of from 2·5 to 5·0 centimetres (one to two inches) in diameter with œdema, pain and tenderness.

In all, 38 persons received one full immunizing dose (0·5 cubic centimetre), 268 received two (0·5 and 1·0 cubic centimetre), and 55 received one, two or more doses in reduced amounts because of sensitiveness.

To summarize, persons who do not react to the skin tests can be given the full immunizing doses (0·5 and 1·0 cubic centimetre). Skin reactors with a reaction up to 1·25 centimetres (half an inch) in diameter can be given 0·1 to 0·4 cubic centimetre, but reactors with a reaction up to 1·8 centimetre (three-quarters of an inch) or more in diameter should never receive more than 0·01 cubic centimetre, for which a long one cubic centimetre "Record" syringe, graduated in hundredths, was used.

Severe Reactions.

Skin Test Dose.—Only four persons showed a severe reaction; three were adults and one was a female child of ten years. The reaction consisted of pain, tenderness, redness and œdema over an area of 10 to 15 centimetres (four to six inches). Two, however, received 0·01 cubic centimetre of anatoxin subcutaneously with only slight local tenderness, quite disproportionate to the skin reaction. Only one person (also an adult) showing another sensitive reaction (2·5 to 5·0 centimetres or one to two inches) had definite symptoms of dizziness and slight headache for some twenty-four hours, particularly for four to five hours. Similar symptoms occurred after each immunizing dose of 0·01 cubic centimetre.

In no other case were there any general symptoms, either with the skin test dose or any of the immunizing doses, despite a few severe local reactions.

Immunizing Dose.—By suitably grading the dosage according to the skin test reaction, as described above, severe reactions to the immunizing dose were avoided. Only one person who failed to react to the skin test showed a fairly severe reaction of 7·5 centimetres (three inches) diameter, which subsided in two days. Two persons showed an anomalous sensitiveness after the second 1·0 cubic centimetre dose, after receiving the first 0·5 cubic centimetre without effect. An area of 15 to 20 centimetres (six to eight inches) tender subcutaneous œdema and redness appeared, but subsided without treatment other than rest. As mentioned, only one person showed any general symptom of transient dizziness and headache.

Discussion.

Precedence in treatment was first given to case contacts. Those under the age of five years were immediately immunized without Schick testing, because of the known high percentage of susceptibles (60% to 100%). Between the ages of five and fifteen years they were first submitted to the Schick test, the reading of the test being made as soon as possible (one to three days, depending on the clarity of the reading), and immunization was commenced at once on those who gave positive reactions.

The immunization of susceptible school children was commenced as soon as those reacting to the Schick test were detected, before another class was tested; and attention was first confined to the infants' school, where susceptibility was greatest. Divided into age groups, the Schick test figures showed the same relative percentage of positive reactions as has been obtained elsewhere, namely, 100% to 70% under five years, and 70% to 40% between five and fifteen years.

During the outbreak instances occurred in which contacts of fresh cases had already been immunized, and as susceptible contacts and school children had been immunized on a fairly large scale, the subsidence of the outbreak was probably influenced by the campaign, though this was difficult to prove, as seasonal changes were also appearing. There is evidence from which this may be inferred, however.

A girl, aged eleven years, reacted to the Schick test on July 18, 1932, and received 0·5 cubic centimetre of anatoxin on July 22, 1932. For a mild sore throat she was swabbed on August 10, 1932, and was found "positive". This infection was proved virulent on September 13, 1932, and no diphtheria had supervened.

A boy, aged six years, reacted to the Schick test on July 12, 1932, and received 0·5 cubic centimetre of anatoxin on July 19, 1932. As a contact he was swabbed on August 5, 1932, and a further 0·5 cubic centimetre was given. This swab was positive, and as his mother and sister developed diphtheria, the chances are high that his swab was a virulent strain, though this could not be tested.

In both these cases apparently sufficient immunity was given by the first 0·5 cubic centimetre of anatoxin.

The first of these children was a contact at school, as were scores of the other immunized children, and one can assume that other infections were similarly prevented, of which no proof exists.

One case of unknown Schick reaction is that of a female child of two years (another member of the family mentioned in the last paragraph but one), who received 0·03 cubic centimetre on August 6, 1932, and gave a positive swab on August 12, 1932. This was very likely to have been virulent, but the child did not develop diphtheria. Although she was likely at her age to have been susceptible, this is not known.

To offset the above evidence of the rapid protective effect of the immunization are cases of clinical diphtheria in two children who had received immunizing doses of anatoxin. These suggest that the speed of development of immunity varies with the individual, although a variation in virulence of the infecting organism would bring about the same apparent difference in immunity. One child had received only 0·25 cubic centimetre of anatoxin (because of some sensitiveness shown in the skin test dose) and the other 0·5 and 1·0 cubic centimetre. Diphtheria later supervened three weeks and one week respectively, but the usual diphtheria symptoms were mild in the second case and absent from the first.

To prove further the immunizing effect of anatoxin, 68 immunized persons were again sub-

mitted to the Schick test. Of them, 52 had received the full immunizing doses of 0·5 and 1·0 cubic centimetre of anatoxin, and of these, five gave a positive Schick reaction, 9·6%, indicating successful immunization in 90·4%. In the positive cases the reaction was in each case feeble, consisting of no more than an area of 1·25 to 1·8 centimetres (a half to three-quarters of an inch) diameter of redness, with little or no induration, and disappearing quicker than their original reactions, with very little residual pigmentation and practically no scaling.

Three persons had received 0·4 and 1·0 cubic centimetre of anatoxin. Of these one gave no reaction, one gave a feebly positive reaction, and one a very faint reaction.

The remaining thirteen had received varying doses from 0·02 to 0·5 cubic centimetre. Four gave feebly positive reactions and the others did not react.

Conclusions.

1. The value of an active immunization campaign during an epidemic is proved by the cases quoted, in which the development of clinical diphtheria was prevented. Partial proof was obtained in other cases and the inference could safely be made for many others. The immunizations were performed over the months of July to October, by which time the outbreak appeared to have subsided. A further 39 cases had occurred, totalling 80, spread over April to October thus: April, 3 cases; May, 14 cases; June, 24 cases; July, 18 cases; August, 11 cases; September, 2 cases; October, 8 cases. Total 80 cases. As the immunity is probably permanent, the value is further enhanced.

2. A campaign conducted during an outbreak of diphtheria will receive a ready response from the public, in contrast to the apathy shown in inter-epidemic periods.

3. It is possible to dispense with a control for the Schick test if time is a factor. And if the matter is very urgent, as about 50% of any group of children of mixed ages may be expected to be susceptible, it would seem that the Schick test could be dispensed with altogether, the added risk involved in injecting immune children being balanced by the quicker development of immunity in the susceptible children. The big disadvantage of mass Schick testing is the time absorbed in performing and reading the tests.

4. The full injections of anatoxin confer absolute immunity (absolute on Schick test standard) in 90% of cases and an increased immunity in 10% (since the Schick test can be read quantitatively to a certain extent). Even small doses cause the development of some activity immunity, but it is not until the first decimal place is reached (0·1, 0·2 *et cetera*) that the immunity is appreciable with only two injections.

5. Anatoxin is to be expected to give no general reaction and no local reaction of serious import if the dosage is regulated by the previous skin test. In young children in whom immunization is most desirable, anatoxin sensitiveness is exceptional.

POINTS IN THE PRACTICAL APPLICATION OF DIPHTHERIA CONTROL MEASURES.

By M. J. HOLMES, D.S.O., M.B., B.S.,
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IN order to provide some indication of the incidence of the children in the community who are carrying organisms morphologically identical with the diphtheria bacilli during an interepidemic period, swabbings were taken from a number of children in Canberra, Federal Capital Territory, in November, 1932. As a contrast, swabs were also taken from a school class in which two cases of diphtheria had recently occurred.

In the case of swabs returned as positive, a virulence test was carried out and the Schick test was also performed.

The two samples were as follows:

A. Exposed group.—53 children; school class, kindergarten; ages ranging from five to seven years.

B. Non-exposed group.—25 children, pre-school age (under five years).

Exposed Group (school class, ages ranging from five to seven years).—There were 53 children in the class selected. There had been two cases of diphtheria in the class a fortnight before the swabbing. The diphtheria patients had been isolated on detection.

Of the 53 children, 15 returned positive swabs (from 15 different families), 29% of the class.

Of the 15 who returned positive swabs, the organisms in nine cases were avirulent (17% of the class). In six cases the organisms were virulent (12% of the class).

In the case of the nine children harbouring avirulent organisms, consent to carry out a Schick test was obtained in eight instances.

Of the eight children harbouring avirulent organisms so tested, the Schick test yielded no reaction in three cases and a positive reaction in five.

Of the six children harbouring virulent organisms, the Schick test gave no reaction in four cases and a positive reaction in two.

In the two patients harbouring virulent organisms and in whom the Schick reaction was positive, the tonsils were enlarged and slightly engorged.

Non-Exposed Group (pre-school age).—Twenty-five children, ranging from two to five years of age, were taken from all sections of a community in which no known cases of diphtheria had occurred for several weeks.

Of the 25 children, six returned positive swabs, 24%. In all six cases the organism was found to be avirulent.

Thus in a group known to have been exposed to diphtheria, 29% returned positive swabs; 17% were carriers of avirulent organisms; 12% of the group were carriers of virulent organisms.

In the non-exposed group 24% returned positive swabs.

In all cases the organisms were avirulent.

This would suggest that the exposure to definite infection had not greatly affected the percentage returning positive swabs, 29% in the exposed group, 24% in the non-exposed group, but that in the exposed group 12% of the group and 33% of those exhibiting positive swabs were carriers of virulent organisms, whereas in the unexposed group no carriers of virulent organisms were found.

The necessity of following up swabbing with virulence testing is obvious.

The rate of non-susceptibles, as indicated by the Schick test, was much higher among those carrying virulent organisms than among those carrying avirulent organisms—67% and 37% respectively.

Of the children who were carrying virulent organisms in the throat and who were Schick positive, and therefore presumably susceptible to diphtheria, none developed diphtheria, although no immunization measures were carried out. The parents were, however, instructed regarding local treatment of the throat.

Although the numbers dealt with are too small to permit of definite conclusions, it is thought that the frequency and size or massiveness of the dose of infection and the physical condition of the child may be as important as the virulence of the organism in the determination of the development of the clinical manifestations of the disease. If the dose, though virulent, is small, a child, though apparently susceptible and harbouring the organisms, may be able to develop an immunity in time to forestall development of the disease.

DIABETES IN CHILDHOOD.[1]

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THE diabetic child of today illustrates one of the great advances in medicine in the present century. Before the isolation of insulin the occurrence of diabetes during childhood meant death usually in one to two years, and occasionally in a period of weeks or months. Within the past decade our ideas have been profoundly altered and we are now pioneering the first generation of diabetic children successfully through adolescence to adult life. Much work has yet to be done before the cure of diabetes can be determined, but it is not amiss to pause and consider what information has been gained and what lessons can be learned from our experience of the past ten years.

[1] Read at a meeting of the Victorian Branch of the British Medical Association on August 2, 1933.

During the last four years thirty-five children have come under my observation, in all of whom *diabetes mellitus* developed before the age of twelve years. Three deaths occurred in this group. My experience in this small series forms the basis of this paper.

Incidence.

Diabetes mellitus is not a common disease in childhood. Statistical evidence of its frequency is difficult to obtain as most of the published figures are based upon mortality findings and not upon those of incidence. In America, Priscilla White estimates that one child in eight thousand develops diabetes each year.

The relative incidence of diabetes in children in Victoria is illustrated by the following figures supplied to me by the State Health Department. Of some five hundred cases of diabetes of all ages notified to the department 7·8% occurred before the fifteenth year. Of these juvenile patients 45% were males and 55% were females. White in a series of 750 children found an incidence of 50·4% in males and 49·6% in females. In the series presented in this paper 14 are males and 21 are females. The age of onset of these cases is shown in Table I.

TABLE I.
Age and Sex Incidence of Diabetes in 35 Children, showing Year of Onset of Disease.

Age.	Male.	Female.
0–1		1931
1–2		
2–3	1933	1924, 1926, 1932
3–4	1926	1931
4–5	1928	1930, 1930
5–6	1931, 1931	1928, 1929, 1931
6–7	1926	1927, 1928, 1929
7–8	1927, 1927	1929, 1931[1]
8–9	1925,[2] 1928	1930
9–10	1930	1928
10–11	1931	1926, 1931
11–12	1933	
12–13	1930[3]	1925, 1931

[1] Died in 1931. [2] Died in 1931. [3] Died in 1932.

Ætiology.

In reviewing the possible ætiological factors concerned in the development of diabetes we are reminded at once of our ignorance of the causation of this disease. From experimental work we know that an animal when it is deprived of its pancreas develops a state which appears to be similar in all respects to *diabetes mellitus* in the human being. We also know that a secretion which is developed in certain cells of the pancreas is capable of preventing the appearance of diabetic symptoms in that animal if administered in suitable quantities.

Applying these facts to clinical diabetes, we might expect to find gross changes in these pancreatic cells in cases which manifested the disease in a severe form. This, however, is not so. Particularly in juvenile diabetes the finding of typical lesions in the pancreas is the exception and not the rule. This has led such an authority as Warren to suggest that the changes which are at times found in the pancreas may be due to some

other factor, at present unknown, which produces characteristic lesions only in a late stage of the disease. No one as yet knows how much insulin is produced by a normal person each day, and it is possible that diabetes may prove to be a disorder of insulin utilization rather than of insulin production. Further, if more insulin be required to control the aberrant metabolism of diabetes, the changes found in the pancreas might be due to exhaustion of the islet cells and not to a primary degeneration. Such speculation, although of much interest, scarcely falls within the scope of a paper of this sort.

Of the known clinical factors which appear to bear some relationship to the development of diabetes, the problem of heredity deserves the first consideration. In twelve of the cases under my observation, a history of diabetes was obtained in some member of the child's family or his antecedents.

In much larger series than the present one evidence of an hereditary taint has been found in anything from 37% to 53% of cases. White has studied this aspect of the subject very thoroughly and has advanced the theory that diabetes is transmitted as a simple Mendelian recessive characteristic. Further work, when the effects of insulin therapy are more apparent, will prove or disprove this contention. The association of obesity with diabetes in middle life has been compared with the finding of overgrowth in conjunction with juvenile diabetes by White and others. I am unable to confirm this observation in the present series.

No definite evidence exists which would suggest that diabetes bears any relationship to the various acute infectious diseases of childhood, although it is possible that, with the loss of tolerance which occurs in diabetes during any infection, a mild case may first manifest symptoms at that time.

The apparent relationship of the development of diabetes to head injuries on rare occasions raises the question of disturbance of the nervous mechanism of insulin production, a subject of which we are still ignorant. In two cases in this series the symptoms of diabetes appeared directly after a blow on the head. In one of these cases, which I quote with the permission of Dr. A. P. Derham, diabetic coma developed ten days after the head injury, the first symptoms of diabetes making their appearance a few hours after the accident.

Another factor, the importance of which is difficult to assess, is the part played by other endocrine glands. The occurrence of diabetes along with disorders of the thyreoid and the pituitary glands is of interest, as is the experimental production of diabetes by interference with the hypophyseal region.

Of all the factors mentioned, none can be considered as the primary cause, and further work has yet to be done to solve the matter. It is possible that in time to come the obese diabetes of middle life and the acute wasting diabetes of youth may be shown to be different diseases.

Symptomatology.

The cardinal symptoms of thirst, polyuria and loss of weight are to be found in the majority of established cases of juvenile diabetes. The length of time which may elapse from the onset of the disease to the development of these classical symptoms varies from a few days to several weeks and, rarely, several months. Because of this I have seen diabetes in the child diagnosed as enuresis and as cystitis. In the present series the onset of diabetes was sudden in five cases. In eight the onset was rapid, with a history of one to two weeks; in twelve it was gradual, with a history of one to three months, while in the remaining twelve the history of onset was indefinite. As already mentioned, the major symptoms of diabetes are those of thirst, polyuria and loss of weight, but in addition to these, less well defined symptoms occur usually before or in conjunction with the classical ones. Such symptoms as alteration in disposition, lack of energy, disinclination to play and a general impression that the child is out of sorts may be noticed. Examination of the urine at this stage usually gives the clue to the diagnosis by the finding of sugar and often acetone in addition. In every case confirmation of the diagnosis should be obtained from examinations of the blood sugar. In any doubtful case a blood sugar curve should be plotted with the use of an appropriate amount of glucose, determined by the child's age and weight. The occurrence of glycosuria due to a lowering of the renal threshold to glucose is rare in children. I have seen one such case.

It occurred in a girl of eight years who had suffered from an intermittent *pruritus vulvæ* since birth. Sugar was found on one or two occasions in her urine. A glucose tolerance test revealed a definite lowering of the renal threshold to glucose and no evidence of *diabetes mellitus*. Subsequent questioning revealed that the pruritus was usually worse after parties, at which, presumably, she indulged freely in rich carbohydrate foods. A mild degree of restriction of carbohydrate food cleared up the pruritus, which had resisted many forms of local therapy.

Transient glycosuria is found in many children under a wide variety of circumstances, such as following excitement or shock, during infections, and in other less well defined circumstances. The only safe course to adopt in such cases is to investigate the condition adequately by blood sugar estimations lest an early mild diabetes be overlooked.

Treatment.

Before proceeding to the consideration of any details of treatment, certain general principles may be discussed.

1. *Diet.*—The modifications of diet which are applied to the adult patient require some alteration before they can be considered suitable for the child. The provision of adequate food for growth, the relatively greater caloric requirements for exercise, the intolerance of certain children for fatty foods, the temptation of carbohydrates, are all factors which require attention in planning the diet of the diabetic child.

To consider some of these points in more detail:

(*a*) Protein. Most authorities consider that an adult requires about one gramme of protein for each kilogram (two and one-fifth pounds) of body weight each day. In the case of the child, in whom protein is needed for growth as well as for tissue repair, it is found that between two and three grammes per kilogram per day are required. White advises that not more than 20% of the total calories of the diet should be derived from protein.

(*b*) Carbohydrate. The question of carbohydrate restriction in diabetes is a much debated point at the present time. Obviously in a disease in which the primary symptoms appear to be concerned with an inefficient carbohydrate metabolism, it seems natural to reduce the carbohydrate content of the diet to the lowest figure which is compatible with safety. Until a few years ago this was done without exception. Recently, as the result of several different lines of reasoning, evidence has been presented to show that the optimal amount of carbohydrate in a diabetic diet, although not yet determined, is probably much higher than the figures to which we have been accustomed. This statement applies particularly to the diabetic child. The occurrence of arteriosclerosis in diabetic children has been given as a reason for thinking that diet containing little carbohydrate and relatively much fat may have some effect upon the development of sequelæ. Another reason is based on the work of Southwood, who, in 1923, showed that the prolonged use of diets high in fat interfered with the normal metabolism of carbohydrate. This is supported by the fact that in a stabilized diabetic patient quite frequently the carbohydrate content of the diet can be doubled and, providing the fat content is reduced *pari passu*, the patient requires no more insulin; in fact, the insulin dosage can sometimes be reduced. Another reason is that from the clinical point of view the child with a moderate allowance of carbohydrate does better than a child who is severely restricted. There is less tendency to dietetic indiscretions, the risk of insulin reactions is lessened and in general the child appears to be in better health and spirits and more contented. At least, that is the impression which I have gained in observing the progress of children on a wide variety of diets.

(*c*) Fat. Despite the fact that diabetes appears to be primarily a disease of carbohydrate metabolism, there is ample evidence of the disturbance of fat metabolism as well. The hypercholesterinæmia of the severe untreated case, the liability of the diabetic child to abnormal depositions of fat, the influence of fat upon the carbohydrate metabolism already referred to, and lastly, the dominant part played by abnormal fat metabolism in that serious complication, diabetic coma, all point to the necessity of attention to the part played by fats in this disease and to the need for care in prescribing fat in unnecessarily large amounts.

(*d*) Other Constituents. As in any condition which necessitates the restriction of normal food, care must be taken to insure that a sufficient quantity of essential mineral substances and of vitamins appears in the diet. As a general rule this is not a difficult matter in the dietetic management of the diabetic child.

2. *Insulin.*—Insulin has not been required in four cases in this series. Each of these patients has been under my observation for more than three years, and as they are all well stabilized and are gaining weight satisfactorily, insulin does not seem indicated at present. White states that all her patients for the past seven years have been taking insulin as a routine procedure. Two patients in this series who were just kept stable by very careful dietetic treatment, were started on insulin, and their subsequent course has led me to believe that in border-line cases, in which stabilization is difficult, it is wise to use insulin in small doses.

3. *Exercise.*—Of relatively slight importance in the adult, exercise plays a much more important part in the control of diabetes in the child. It undoubtedly enhances the effect of insulin, a fact which is of importance in regard to insulin reactions and to which I shall refer again.

4. *Education.*—*Diabetes mellitus* is at the present time an incurable disease. With appropriate treatment it can be held in control, and, if this is done, growth and development of the child will proceed normally. The function of the physician is to determine the measures necessary for this control. As to whether these measures are carried out satisfactorily the physician is only partly responsible, as the parents must play their part. It is therefore a necessary and essential part of the physician's duty to educate the parents in the nature and treatment of diabetes. This cannot be done merely by handing a book to the parents and telling them to read it. Personal interviews, instruction in the weighing and measuring of food by a dietitian, instruction in urine testing and in the full technique of insulin injection by a competent nurse, and the giving of injections under supervision are all necessary parts of their education. It is only by patience and by careful attention to detail that one can hope for satisfactory results. If the child is old enough, his education can be commenced. He should be capable of injecting his own insulin by the time he is ten years old, and often before that age. The parents exercise a supervisory influence over the young patient and play a large part in developing in the child a proper outlook on the disease and on life. I do not mean for one minute to infer that the diabetic child is to be brought up as an invalid. He is in all respects to be regarded and treated as a normal child, and the parents must be educated up to this point of view.

It can be asserted with confidence that the outlook for any diabetic child is largely dependent upon the intelligence and the cooperation of the parents.

The Stabilization of a New Patient.

To proceed to the problem of the stabilization of a new and untreated patient: What is to be done? A short period of hospital treatment is essential in my opinion. Unless some special reason exists, this period should not exceed two or three weeks; by this time it should be possible to discharge the child in a stable state, and during this time the education of the parents should be commenced. I have seen two children who have experienced long periods of hospital treatment, one for three years and the other for five years.

The first child is one of the most unsatisfactory patients I have, and the parents are now engaged in an attempt to gain some control over the child, who has developed into a spoilt invalid.

The second child died in coma shortly after his discharge from hospital at the age of sixteen years. He had developed into an utterly irresponsible youth, over whom no one had any control, a necessary consequence of the constantly changing staff of any large hospital.

After arrival in hospital the child should not be confined to bed unless there is some definite indication. It is usually unnecessary and the child resents it.

The diet is calculated so as to allow a sufficient number of calories per day for growth and maintenance of body weight. From 40 to 70 calories per kilogram per day will be required. The protein is set between two and three grammes per kilogram per day. With regard to the distribution of carbohydrate and fat, I consider that the ratio of the total carbohydrate equivalent (G. value) to the total fatty acids should never be less than 1·0/1·0. At times the carbohydrate may be increased considerably so that the ratio may become 2·0/1·0 or even higher. The actual calculation of a diet for a child of seven years, weighing 28·3 kilograms (sixty-three pounds) is shown in Table II. The use of such a scheme as Lawrence's line diet system, although of great use in the treatment of the adult patient, is, in my opinion, often unsuitable for the treatment of children, because of the fixed ratio of protein to fat, so that if sufficient protein is prescribed, the fat content of the diet is often too high. I prefer to work out a separate diet for each patient and to modify it from time to time as the circumstances demand.

The partition of the diet is of importance. For patients taking insulin twice a day I try to arrange that the bulk of the food is balanced with the insulin injections, namely, two-fifths of the total diet in the morning and the evening meals, and one-fifth in the mid-day meal. If this is done, the process of stabilization is rendered easier. For those patients taking insulin three times a day and for those who do not require insulin, the food value is divided evenly over the three meals. I am in favour of allowing a small amount of food between meals and before going to bed. If this is done, there is less temptation for the child to touch forbidden food. These intermediate feedings are of value in preventing insulin reactions in cases in which stabilization is difficult.

TABLE II.

Child, aged seven years, weight 28·3 kilograms (63 pounds).

Diet—

Carbohydrate	200 grammes
Protein	70 grammes
Fat	70 grammes
Calories, 1,710	
Glucose	248 grammes
Fatty Acids	95 grammes
Glucose/Fatty Acids: 2·6/1·0.	
Calories per kilogram	2·4
Protein per kilogram	2·4

Insulin dose: 20 units morning, 14 units evening.

Diabetic Diet.

Meal.	⅓ ⅓ ⅓	Carbohydrate. 200.	Protein. 70.	Fat. 70.
Breakfast:				
Egg	1		6·7	5·3
Milk	8 ozs.	12·0	7·9	9·6
Crispies	½ oz.	16·2	1·1	0·3
Bread	2 ozs.	31·1	5·6	0·5
15% Fruit	4 ozs.	15·2	1·0	0·6
Butter	½ oz.			6·8
		74·5	23·3	23·1
Dinner:				
Meat (lean)	1½ ozs.		8·5	4·0
3% Vegetables	5 ozs.	4·5	2·4	0·5
Bread	1½ ozs.	23·4	4·2	0·4
Milk	4 ozs.	6·0	3·9	4·8
15% Fruit	4 ozs.	15·2	1·0	0·6
Butter	½ oz.			6·8
		49·1	20·0	17·1
Supper:				
Meat	2 ozs.		11·3	11·3
1·5% Vegetables	4 ozs.	1·8	1·9	0·4
Milk	8 ozs.	12·0	7·9	9·6
Bread	2 ozs.	13·1	5·6	0·5
15% Fruit	4 ozs.	15·2	1·0	0·6
Rice	½ oz.	19·0	1·8	0·1
Butter	½ oz.			6·8
		79·1	29·5	29·3
		202·7	73·6	69·5

As to whether insulin is necessary or not, I suggest that if, after a few days on a balanced diet which is sufficient for the child's needs, there is no decrease in the urinary sugar, insulin should be given. I am not in favour of starvation as an initial procedure. It prejudices the child against treatment, it is at times dangerous, it causes further loss of weight, and the process of "laddering" subsequent to starvation is tedious and is usually a failure. I prefer to feed the child from the start, and I do not hesitate to use insulin if I think it is necessary. The child is weighed at the commencement of treatment and at weekly intervals thereafter, and the diet is adjusted so that a satisfactory gain occurs. All nomographic charts and other recommendations as to the caloric requirements of a child of a given height and weight are only approximations. Each child must be treated according to its response to treatment, and not by rule of thumb. As soon as treatment is started the education of the parents should commence along the lines which I have already mentioned. During the process of stabilization the child should be up and about. If the child is stabilized in bed it will be found that as soon as he leaves hospital and resumes his normal activity, the effect of exercise may result in insulin reactions, often within a few days of his discharge. This is unfortunate and may

have a disturbing effect upon both parents and child. It is my practice, as far as possible, to insist that during the second or third week of hospital treatment the child returns to school or resumes his normal daily life, remaining in hospital merely for his meals and to sleep. The child on discharge is then returned to his parents stabilized for his usual daily life, and not for the artificial conditions of hospital routine.

At times the initial period of hospital treatment has to be prolonged to four or more weeks. There are certain children in whom the margin of error between a urine free from sugar and occasional insulin reactions is very small. Such children require very careful adjustment of diet and of insulin dosage. Higher carbohydrate feeding is sometimes of help in such cases.

Following discharge from hospital, the child should be kept under close medical observation for a few weeks until it appears that the progress is satisfactory, then the intervals between visits can be prolonged. The parents must be directed to keep a record of the weight and of the results of testing the urine of the patient. I usually direct that two samples of urine be tested each day: the fasting urine and a sample passed two hours after the evening meal.

Insulin.

The amount of the initial dose of insulin is determined largely as a result of experience. Five units once or twice daily are usually quite safe, and the dosage is varied from time to time to meet the requirements of the case. The occurrence of insulin reactions during the process of stabilization is to be avoided if possible, as a further temporary instability often results for some hours. In the growing child, with the necessity for increasing the diet from time to time, the insulin dosage may rise also.

The symptomatology of insulin reactions in children is very varied. The child may rather suddenly become apathetic and disinclined to play, weakness and sweating may occur, muscular incoordination is at times apparent, resulting occasionally in squinting. Voracious appetite may be a prominent symptom. Any of these symptoms may go on to actual unconsciousness or coma. Occasionally coma occurs with alarming suddenness as the initial symptom. I have seen insulin reactions appear ten minutes after an injection and as late as sixteen hours after the last dose of insulin is given. The most usual times for reactions are at mid-day, in the late afternoon, and between eight and twelve o'clock at night.

Exercise plays an important part in the development of reactions in the stabilized child. The volatile nature of some children and the irregular amount of exercise from day to day enhance the difficulty in some cases. If the parents are intelligent, they may anticipate exercise and vary the dosage of insulin accordingly.

One mother has told me that whenever her son, aged eleven years, goes for a swim, his evening insulin is reduced by six units, while a night with the Wolf Cubs is worth four units.

Abnormalities of behaviour may occur as rare symptoms of insulin reactions.

One boy, aged twelve years, showed symptoms resembling those of post-epileptic automatism, wandering half a mile from his home and entering a strange house, where he frightened the occupants with his queer behaviour.

Another child, verging on a reaction which was not recognized by the mother, was reprimanded for peevish behaviour during a meal. She responded by hurling a freshly poached egg in her mother's face.

The convulsive type of reaction is at times mistaken for epilepsy, an error which should not be made if the nature of the case is properly understood. The treatment of such reactions in the early stages is a simple matter. The sucking of a small amount of barley sugar or of loaf sugar, a sweetened drink or a biscuit is usually sufficient to abolish all symptoms. In the more severe cases 0·5 cubic centimetre of pituitrin given intramuscularly, or five to ten cubic centimetres of a 50% glucose solution injected into a vein will usually cause the most serious symptoms to cease. I have observed a delayed recovery from an insulin reaction on one occasion.

A male child, aged seven years, stabilized on a balanced diet with twelve units of insulin twice daily, was taking his breakfast at the ordinary time. He suddenly dropped his fork, cried out, and became unconscious. He was hastily brought to hospital, and within two hours he had biochemically recovered. His blood sugar, which was 0·03% on admission, rose to 0·21%, and 0·4% of sugar was present in his urine. Despite this fact, he remained in a semi-conscious state for almost twenty-four hours, although during that time his urine contained sugar and the blood sugar remained raised.

I offer no explanation of this phenomenon, which I have observed on rare occasions in adults.

One case of definite lipodystrophy has occurred in this series. It seems to be concerned with the prolonged use of any one area for insulin injections. The site of injection should be varied at frequent intervals. It is a source of wonderment to me to look at the arms and legs of one child who has taken insulin for the past nine years, during which time she has had, at a conservative estimate, some six thousand injections of insulin, and to observe that her skin and soft tissues are in as good a condition as those of any normal child.

Diabetic Coma.

No greater illustration exists of the alteration which has taken place since the introduction of insulin than the change in our outlook on diabetic coma. Although it is still a serious complication, it is by no means invariably fatal. In this series coma has occurred thirty times. There have been three deaths. One child, despite the fact that she has been in coma on six occasions, is alive and well. Several other children in this group have been in coma on more than one occasion.

The details of the three fatal cases are of interest.

One death occurred in a child four weeks after the onset of severe diabetes. Medical aid was sought for the first

time after the onset of coma, and she was admitted to hospital fourteen hours after its onset. She failed to respond to treatment and died of circulatory failure.

The second case was that of a boy of fourteen years who came under my observation at the age of twelve years. As a result of a trial of herbalist measures he became unstable and was taken to the country by his mother directly against my wishes. He died four days later in coma.

The third patient was a boy of sixteen years who had suffered from diabetes for six years. For the last five years of his life he was an inmate of the Austin Hospital. He was discharged, and four weeks later he lapsed into coma. He was brought to hospital eighteen hours after the onset of coma and failed to respond to treatment.

The common predisposing factors in the development of coma are: (i) neglect of instructions relative to diet and insulin or the upset of these instructions during an illness, (ii) the presence of an acute infection, (iii) rapid and unrecognized diabetes diagnosed for the first time after the onset of coma.

The onset of diabetic coma is usually gradual, with a history of one or more days of disinclination for food, apathy, nausea and vomiting. These symptoms are followed by the development of drowsiness and coma, with the development of the characteristic "air hunger" type of respiration. Occasionally I have seen an established coma develop from a state of normal health in a period of eighteen hours.

The usual causes of death in diabetic coma are: (i) circulatory failure, (ii) renal failure, (iii) failure of the action of insulin in the presence of infection. These causes must be borne in mind in directing treatment.

The principles in the treatment of a case of diabetic coma are: (i) Speed in initiating treatment. Diabetic coma is comparable to the rupture of an abdominal viscus. Every hour before the commencement of treatment materially prejudices the patient's chances of recovery. (ii) Relief of the ketosis by means of frequent injection of adequate amounts of insulin. Glucose is often necessary in addition. (iii) The recognition of the early stages of circulatory failure by constant observations of the pulse and blood pressure. The prevention of circulatory failure is concerned with the maintenance of the body temperature and with the administration of copious quantities of fluids by all possible routes.

A stomach wash-out and a bowel wash-out are usually necessary at the outset of treatment. As to the insulin dosage, this will vary with the severity of the case. I usually give forty or fifty units as an initial dose and follow this up with further doses of the same order at intervals of one to two hours until signs of improvement appear. It is advisable to give some form of carbohydrate by mouth during this period. Glucose is often nauseous, so fruit juice flavoured with cane sugar or gruel or arrowroot can be given.

Frequent observations of the urine are made, but on occasion the urinary findings may prove an unreliable guide. In the majority of cases of coma albumin is to be found in the urine, while casts and red blood corpuscles are to be seen under the microscope. The kidney function is gravely upset, and this may affect the renal threshold.

This point is illustrated in the case of a child of eight years who, fourteen hours after the commencement of treatment, showed 0·2% of sugar and only a slight trace of acetone in the urine. As she was undoubtedly ketotic because of the presence of gross air hunger, and as her clinical condition was not satisfactory, it was thought that she might possibly be suffering from a mixture of hypoglycæmia and ketosis. A blood sugar estimation was made and found to be 0·71%. Obviously the renal threshold to sugar and to acetone was grossly disturbed. Recognition of this fact and the continuance of insulin therapy resulted in recovery.

The most valuable guide as to the time to cease intensive insulin therapy is the decrease in the degree of air hunger.

With regard to the treatment of circulatory failure, if it occurs, apart from the usual stimulants, such as caffeine, pituitrin, "Coramine" *et cetera*, the intravenous administration of 300 cubic centimetres (ten ounces) of a 1·6% saline solution is of very distinct value. This can be repeated at frequent intervals if necessary.

Illness.

It is well known that any infection, however slight, may upset the stabilization of a diabetic patient. If no gastric disorder occurs, the ordinary diet should be continued with an increase in the insulin dosage to cover the temporary loss of tolerance. If digestive upset is present, a fluid diet should be prescribed, in which the carbohydrate content of the ordinary diet is maintained or even increased and the fat content much reduced. This diet, together with an increase in the insulin dosage, will tide the child over the acute disturbance until such time as the normal diet can be resumed.

Surgery.

Provided appropriate precautions are taken, the diabetic child can be subjected to ordinary surgical procedures without undue risk. The pre-operative administration of 15 grammes (half an ounce) of glucose on two or three occasions, together with ten units of insulin, is usually sufficient to protect the child against a post-operative ketosis. It is advisable for the child to be in hospital for a day before the operation and he should remain until he is stable on his ordinary diet again. The use of gas anæsthesia is desirable, because of the lessened risk of post-operative vomiting.

In this series appendicectomy has been performed on three occasions, tonsillectomy on eight occasions, tooth extraction under general anæsthesia on six occasions, and other minor procedures on ten occasions. The post-operative mortality has been nil.

Growth.

The growth and development of the stabilized diabetic child is apparently undisturbed by the disease, and the secondary sexual characteristics develop normally. One disturbing fact is the discovery that a certain number of diabetic children

develop definite evidence of arteriosclerosis after a few years. The problem of diabetic vascular disease is assuming greater importance each year. The underlying cause is not known, but it appears that the constantly stable patient runs definitely less risk of arteriosclerosis than does the patient who is never quite stable.

Results of Treatment.

It has been often stated that insulin has not reduced the mortality from diabetes. As its administration is a palliative measure, it is difficult to see how anyone could expect it to reduce the mortality. The effects of insulin are to be found in a study of the mortality in the various age groups of diabetes. It is found that with the prolongation of the lives of the younger diabetics there has been a decline in the mortality in the early decades of life and a corresponding increase in the older age groups.

Conclusion.

In conclusion, let me repeat that we are advancing with a new generation of diabetic children from whom we are learning new facts about the nature and the course of this disease. Only by continued observation and the slow additions to our knowledge can we hope to unravel the problems bound up in the causation and the cure of diabetes.

Acknowledgement.

I desire to express my sincere thanks to Dr. F. Kingsley Norris for his advice and assistance during the past four years.

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THE PERENNIAL TREATMENT OF HAY FEVER.

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IN Victoria patients sensitive to grass pollens usually notice that their symptoms of hay fever commence in October and disappear about the end of January, and the usual routine is to commence intensive preventive injections of pollen extracts early in July, in order to establish as high a degree of immunity as possible by October, when pollens become plentiful. From then till Christmas doses are given about every eight to ten days to maintain this immunity. After that no further treatment is given and immunity gradually falls during the next six months and is reestablished by a further course of injections commencing in the following July. It is usual to recommend treatment by this pre-seasonal method for three successive springs, and it is usually found that by then sensitiveness has diminished so much that no hay fever occurs except with gross exposure to pollen.

During the past few years workers in England and America have sought for some way of lessening the tedium of treatment, and it has been found possible to maintain the degree of immunity which has been established by giving full doses of pollen at comparatively long intervals. The features of allergic hypersensitiveness resemble in many ways those of artificial anaphylaxis, and it is generally considered unsafe to give large doses of an antigen at intervals of more than seven days. Pollen extracts are very potent, and alarming and even dangerous reactions may occur from overdosage. However, cautious trial has shown that it is safe, once tolerance has been established for a large dose of pollen, to repeat this dose at intervals of as many as twenty-eight days. It is thus possible to treat a patient intensively with, say, fifteen injections of increasing potency, spread over about twelve weeks, and to maintain the immunity established by a further ten to fifteen injections spread over the remaining nine months. Each of these subsequent injections is of the same quantity, as it is quite unsafe to increase the dose at such long intervals, although it appears to be comparatively safe to repeat it.

The extracts most commonly used are prepared according to Arthur F. Coca's methods[1] and contain 0·1 milligramme of nitrogen per cubic millimetre. This is commonly called D strength, and dilutions containing one-tenth, one one-hundredth and one one-thousandth of this strength are designated C, B and A strength respectively. With a very sensitive patient one would start with 0·1 cubic centimetre of A, but it is usually safe to start with 0·05 cubic centimetre of B and proceed to double the dose at each visit until fairly marked local reactions appear within an hour at the site of injection or until mild general symptoms (hay fever, asthma or urticaria) give warning that the dose is dangerously large. Thereafter one may have to repeat the same dose two or three times until diminished local reaction shows that tolerance for that quantity has been established, and then proceed more cautiously (25% to 50% increments) to increase the dose. By this means one usually reaches a dosage of about 0·3 to 0·5 cubic centimetre of D strength with about fifteen doses spread over two or three months, and one then repeats this final dose without further increases at lengthening intervals until it is given once in two to four weeks. By this means it is possible to maintain the tolerance established by the intensive treatment.

Advantages and Disadvantages.

From the patient's point of view this method involves less waste of time and rather less expense, and it seems to insure a better result. For the physician it has the advantage that treatment is spread throughout the year and less congestion occurs in the hay fever season.

Among disadvantages one must recognize that in a small proportion of patients the doses at long intervals do not maintain the immunity, and one

may find that although the last of the doses given at short intervals gave no local reaction, say, on December 1, the first long interval dose on January 1 produces an obvious local reaction, and on February 1 the same dose may produce such a large reaction that one is driven back to giving doses at short intervals or abandoning treatment till the next July. Fortunately such cases seem fairly rare, but they should be watched for and recognized, otherwise serious upset may occur. One patient who had severe seasonal asthma for over twenty years, was apparently cured by desensitization to pollens, but when a constant maintenance dose was given at intervals of more than three weeks, she always had slight asthma for forty-eight hours after the injection, although very little local reaction occurred. The dose was slightly diminished and given at intervals of fourteen days, and no further attacks have followed. Most authorities[2][3][4] are enthusiastic over the improved results from this modification, but Unger[5] and Thommen[6] are strongly opposed to intervals of more than fourteen days between injections. Another disadvantage is that the same batch of pollen extract must be used throughout the treatment, as different lots of extract may vary widely in potency. It is best to try to estimate how much will be used for the course and have the reserve kept in a refrigerator until it is needed. If one has to change to a new batch in the middle of a treatment, it is usually necessary to go back to perhaps one one-hundredth of the dose and work up rapidly to the full dose, judging by local reaction and the patient's observations how rapidly to increase.

But in spite of these limitations this method appears to be a useful modification of the more established method of seasonal treatment. It is particularly useful in cases of asthma due to pollen, and several patients who have had continuous treatment for eighteen months appear now to have lost almost all skin sensitiveness to pollen, and most of their asthmatic symptoms.

Precautions.

In this description of a modification of the older methods, only slight reference has been made to the precautions to be taken in applying pollen therapy. These have been dealt with in a previous article,[7] but it must be emphasized that pollen extracts are very potent substances, and dangerous symptoms may follow injection of an overdose. Each patient is different, and no routine procedure can be laid down for all cases. Great care must be taken not to increase doses too rapidly, but if constitutional symptoms do occur, a tourniquet and adrenaline are the best remedies.

Summary.

It has been found that once immunity to pollen is established by routine desensitization it is possible to maintain this by giving a constant "maintenance" dose at intervals of two to four weeks. This method is not applicable to all patients, but it appears to be a useful modification of the more usual method of pre-seasonal desensitization.

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Reports of Cases.

OBSERVATIONS ON TUMOURS IN NEW BRITAIN NATIVES.

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LITTLE has been recorded of tumours occurring in New Britain natives, and they have been considered something of a rarity in these people. The present series of cases, observed during a period of eighteen months, shows that malignant disease is far more common than has been previously thought. Other cases considered to be malignant were also seen, but the diagnoses were not confirmed, usually because the patients were not seen after the first examination.

All patients were full-blooded New Britain natives, living within thirty miles of Rabaul, on the Gazelle Peninsula. The history in each case is brief and far from accurate owing to the fact that the average native has no memory for time.

Though the series of cases is small, it must be remembered that they occurred amongst a very small proportion of the population of New Britain. The population of the Mandated Territory of New Guinea has been estimated to be at least 400,000, and there are still parts of the territory where no white man has penetrated, and consequently no census of the population has been taken. The population amongst whom these cases were seen could not have numbered more than a few thousand. Further, these cases were not seen in a systematic examination of the natives of that part, but in those patients who voluntarily visited the mission hospital for treatment.

Still another important point is that the expectation of life of natives is much less than that of Europeans, and would probably be about fifty years at the most. Under such conditions one would expect to find a smaller proportion of carcinomatous growths, but it is significant that in this series of ten malignant tumours five were epitheliomata. One would be inclined to think that the occurrence of malignant disease amongst these people is not so very much less than that amongst civilized races.

The twelve cases here recorded are: one epithelioma of the lip, three epitheliomata of the cheek, one carcinoma of the breast, one endothelioma occurring in bone, two osteogenetic sarcomata, one lymphosarcoma, one case of Hodgkin's disease, one dermoid cyst, one ovarian cyst.

As MacCallum[1] states, "we are not quite sure whether Hodgkin's disease is a tumour or not", so that, in the present uncertain state of our knowledge, this case has been included, assuming that it is a tumour.

CASE I.—An adult male, aged about forty years, was admitted with a history of an ulcer on the lip for about eleven months and a swelling in the neck which appeared

some time after. On examination he was found to be very emaciated. At the left angle of the mouth and on the upper lip was a large ulcer, about 2·5 centimetres (one inch) in diameter, extending upwards on to the cheek for 1·2 centimetres (half an inch) on the skin surface and 2·5 centimetres (one inch) on the inside of the cheek. The surrounding tissues were markedly infiltrated, and the edge of the ulcer was firm and "heaped up". On the side of the mandible and in the submaxillary region was a hard mass definitely fixed to the bone. The surrounding lymph glands were enlarged and hard. There was a free discharge of foul pus both into the mouth and on to the skin surface. A piece of the submaxillary mass and a snipping from the edge of the ulcer on the lip were taken for histological examination. The patient rapidly became worse until it was impossible to feed him, and he died a few days after admission to hospital.

Both pieces removed for microscopic examination showed marked keratinisation of the epithelium, which was everywhere prolonged into the subjacent tissues. There was extensive infiltration of the tissues by epithelial cells from these downgrowths, with marked cellular reaction of small round cells and polymorphonuclear leucocytes. Many cell nests were present. The diagnosis was squamous-celled epithelioma of the lip with secondary involvement of the lymph glands.

CASE II.—An adult male, aged about thirty-five years, gave a history of an ulcer inside the left cheek for about two months. This commenced opposite the second lower molar tooth, and on examination was found to be about 1·2 centimetres (half an inch) in diameter. The edges were hard and everted; the base of the ulcer was pale. There was great induration of the surrounding tissue, and one slightly enlarged, hard submaxillary lymph gland was felt. A snipping taken from the edge of the ulcer for microscopic examination showed normal epithelium, merging at one end into an irregular infiltration of the submucous tissue by epithelial cells, many of them in a state of active mitosis. In this area all signs of a basement membrane had completely disappeared. The stroma was slight in amount, while at the base of the infiltrated area there was a dense accumulation of small round cells. In several areas there were signs of commencing cell nest formation. The appearance was that of an actively growing epithelioma (Figure I).

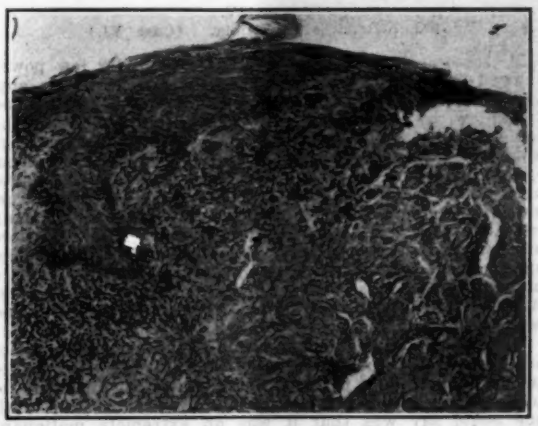


FIGURE I.
Microphotograph of epithelioma of the cheek (×150). (Case II.)

CASE III.—An adult female, about thirty years old, complained of an ulcer on the inside of the left cheek for about six months. Examination showed an ulcer of the cheek 1·2 centimetres (half an inch) in diameter, opposite the left upper molar teeth, with hard edges, pale base, and infiltration of the surrounding tissues. There was also a hard submaxillary lymph gland palpable. Histological examination of a snipping from the edge of the ulcer showed, for the most part, epithelium with marked prolongations into the submucous tissue, with a definite basement membrane. In the submucous tissue there was a dense accumulation of small round cells. The appearance was consistent with that of irritated epithelium. In one place, however, of which the microphotograph has unfortunately just shown the edge, the basement membrane had completely disappeared and the epithelial cells had infiltrated the submucous tissue. Small clumps of epithelial cells, surrounded by masses of small round cells, were present at some distance from the infiltrating edges. The appearance was therefore that of an epithelioma developing from an area of irritated epithelium (Figure II).

FIGURE II.
Microphotograph of epithelioma of the cheek (×150). (Case III.)

CASE IV.—An adult female, aged about forty years, was admitted to hospital with a history of an ulcer inside the left cheek "for a long time" and an ulcer on the outer surface of the cheek for two months. Examination showed a fungating mass on the left cheek, 2·5 centimetres (one inch) in diameter, with hard, everted edges, and a pale base. In the centre of this mass was a cavity one centimetre (three-eighths of an inch) in diameter, communicating with the buccal cavity, where a huge ulcer was found occupying the greater part of the cheek. There was marked infiltration of the tissues of the cheek. The left submaxillary and the submental lymph glands were enlarged, hard, and discrete; and the left deep cervical lymph glands were also enlarged. A small piece was taken from the outer mass for examination and showed definite malignant characters. The skin showed some prolongations extending deeply into, but well defined from, the underlying tissue, which consisted of proliferating cells of epithelial type, tending to have an alveolar arrangement and showing active mitosis. There was an intense leucocytic reaction.

It was intended that a piece for section also be taken from the ulcer in the mouth, but the patient left hospital before this was done and was not seen again before I had to leave for Australia. Though the type was uncertain from microscopic examination, the history and clinical examination left no doubt that this was another case of epithelioma of the cheek.

Betel-nut chewing is almost universal in both sexes throughout this part of New Britain. Stewart[3] considers betel-nut cancer an excellent example of cancer showing the importance of local factors in cancer causation, but points out the varying incidence in betel-nut chewing communities. It is suggested that the difference may be due to the varying composition of the "quid". Though the present series of cases of malignant disease is so small that no conclusions could be drawn from it, it is significant that four of the ten cases were of this type. The "quid" in these parts consists of the betel-nut (*Areca catechu*), slaked lime (usually prepared from coral), and

in most cases the green fruit of the pepper vine. Sabesan[3] believes that the high incidence in Madras is due to the chewing of tobacco with the betel-nut. Though most New Britain natives smoke strong "trade" tobacco, usually either as cigarettes, or more commonly in short clay pipes, tobacco chewing is relatively uncommon. Betel-nut chewed without lime has a definitely astringent action on the buccal mucosa, and when chewed with lime it produces an intense burning sensation in the mouth, which is further greatly intensified if the fruit of the pepper vine be added. "Current Comment" on the article by M. J. Stewart in THE MEDICAL JOURNAL OF AUSTRALIA[4] states that in the Pacific betel-nut cancer is either rare or non-existent. The above cases at least show that it does occur. A systematic examination of all natives for this condition would probably show it to be far more common than has been thought.

CASE V.—The remaining carcinoma was seen in an adult female of about thirty-five years of age. The history was of a spreading ulcer in the right breast for several years, with pain during the last few months. Examination revealed a huge ulcer replacing the whole of the right breast, about ten centimetres (four inches) in diameter. The edges of the ulcer were hard, everted, and fixed to the underlying structures, while the base of the ulcer was firmly adherent to the ribs. From the edges of the ulcer brawny induration extended into the left breast and right axilla, where there were numerous enlarged lymph glands, forming a large, hard mass, fixed to the surrounding tissues and skin. The patient was in extreme pain the whole time. Histological examination of a small piece of tissue from the edge of the ulcer revealed normal epithelium ending abruptly at the edge of the ulcer, the base of which showed dense round cell accumulation with some blood vessels and fibrous tissue. The greater part of the section consisted of irregular masses and strands of epithelial cells, showing a moderate degree of activity, in a fibrous tissue stroma. In a few places they showed some tendency towards an alveolar arrangement, but for the most part were actively infiltrating the surrounding tissue. The appearance was typical of a carcinoma of the breast (Figure III).

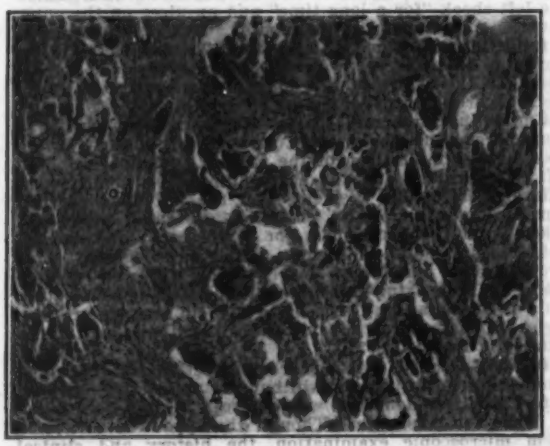


FIGURE III.
Microphotograph of carcinoma of the breast (×150). (Case V.)

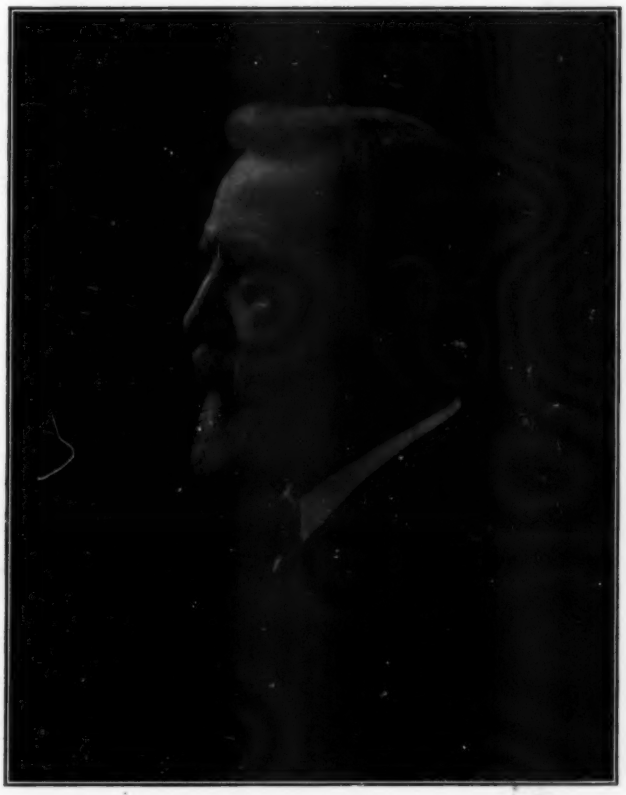
CASE VI.—An adult male, aged twenty-five years, was seen with a swelling over the upper third of the left tibia. At first he gave a history of only one month's duration, though later he said that he had noticed a small swelling in this situation for about three months. At the onset the swelling had been very painful, but when seen he said it was painless. On examination there was a large swelling over the medial surface of the head of the left tibia, extending downwards for about 7·5 centimetres (three inches) (Figure IV). The swelling was hot, red, slightly tender, and fluctuant. There were a few small incisions which had been made by some native in his village. The knee was partly flexed, and the only movement obtainable was a slight degree of passive movement, which caused great pain. The swelling appeared to be inflammatory, and on this supposition was opened with the patient under general anæsthesia. On incising the swelling, blood gushed forth. Inserting the finger gave a sensation like pushing into a rubber sponge. The cortex of the tibia was entirely missing for a space of about five centimetres (two inches) in diameter, the cortex at the edge being greatly thinned, breaking very easily. On withdrawing the finger a cheesy material escaped.

FIGURE IV.
Endothelioma of the tibia. (Case VI.)

Microscopic examination of this tissue under low power showed it to be highly cellular, with practically no supporting stroma. There were many large and small blood spaces, with no definite wall separating them from the tumour cells. Some of the blood spaces contained large numbers of polymorphonuclear and mononuclear leucocytes; others were packed with red corpuscles. Under high power magnification the cells were seen to be large, ovoid, with signs of extreme activity. The nuclei in many cases, as seen in the microphotograph (Figure V), were undergoing active mitosis. In some cases the nuclei appeared to have divided so rapidly as to give rise to multinucleated cells. In some of the larger blood spaces tumour cells were seen lying free amongst the blood corpuscles.

Though the clinical examination (there was no sign of any primary focus elsewhere) and X ray appearance suggested it to be a periosteal sarcoma of the tibia, microscopic examination did not absolutely confirm this. All one could say was that it was an extremely malignant tumour, probably an endothelioma. It is possible that it was a secondary growth from some hidden primary focus, perhaps in the adrenal or kidney.

A few days after the first incision the leg was amputated through the middle of the thigh. There was slight infection of the wound, but, except for this, convalescence was uneventful. Section of the tumour after amputation showed it to be infected. There was a large hæmorrhagic mass extending into the medulla of the tibia, the cortex being completely absent for a distance of 7·2 centimetres (two and a half inches). The tumour extended under the patella into the cavity of the knee joint.



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Three months later the patient was well, but since my return Australia I have heard that the boy died about fifteen months later, apparently with a recurrence, which tends to support the theory that the tumour was a secondary deposit.

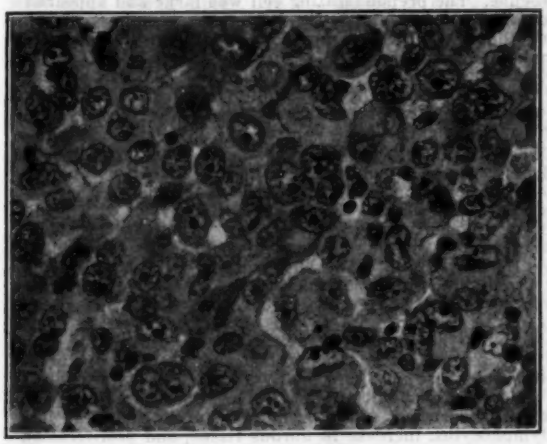

FIGURE V.
Microphotograph of endothelioma of the tibia (×800). (Case VI.)

CASE VII.—A male, aged about thirty years, gave a history of a swelling on the left side of the lower jaw for several years (Figures VI and VII). This had steadily

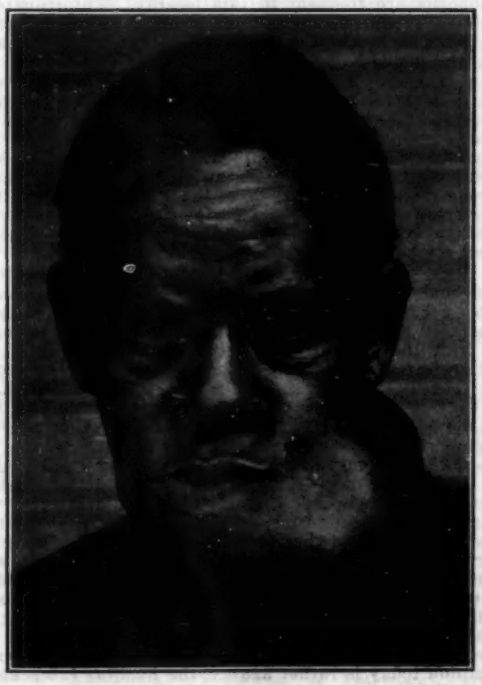

FIGURE VI.
Osteosarcoma of the mandible. (Case VII.)

increased in size, but caused no trouble until a few months before he was seen, when difficulty was experienced with mastication. The patient's general condition was good. On the mandible was a large mass, fixed to the bone and apparently growing from it. The mass extended from the angle of the mouth on the right side to the left ramus of the mandible. For the most part it was stony hard, but in some scattered areas fluctuation was present. In many parts it was firmly adherent to, and in some places appeared to have actually infiltrated the skin. The lip was not involved, its prominence being due to the remarkable thickening of the mandible, which was about 3·5 centimetres (one and a half inches) thick. Some teeth were still present in the lower jaw. As the mass extended as a whole into the submaxillary region, it was impossible to palpate lymph glands. There was limitation of movement of the jaw, due to extension of the mass up the ramus of the mandible. Salivation was excessive, the saliva trickling out of the mouth; and there was a very foul odour, though no discharge was evident.

FIGURE VII.
Osteosarcoma of the mandible. (Case VII.)

Some days later one of the fluctuant areas commenced to discharge sero-purulent material. A smear of this discharge stained by Gram's method showed it to consist almost entirely of polymorphonuclear leucocytes. A few groups of Gram-positive cocci and occasional Gram-positive and Gram-negative bacilli were seen. There were no granules in the discharge and no signs in the smear of the actinomycosis fungus (*Discomyces bovis*).

X ray examination revealed appearances typical of a slow growing osteosarcoma of the mandible.

CASE VIII.—An adult male from the Baining Mountains was admitted to hospital with a history of swelling of the right forearm and elbow for a long time. Examination revealed a greatly thickened elbow, with so much induration of the soft tissues of the upper part of the forearm and lower half of the arm that it was impossible to palpate any bony structures. There was no movement at either the radio-ulnar or the elbow joint.

X ray examination revealed well marked increase in size and honeycombing of the internal humeral epicondyle; there was also erosion of the external epicondyle. There was marked bowing of the shaft of the ulna, mushrooming of the head of the radius, and a well marked area of periosteal reaction in the middle of the shaft of the radius. All bones showed loss of outline, and the soft

tissues surrounding the joint on all sides showed a marked increase in density. The X ray appearance suggested an osteosarcoma.

CASE IX.—Another extremely interesting case was that of a boy aged about twelve years. He gave a history of having been ill for six months, with generalized abdominal pain, fever, and constipation. On examination he was extremely wasted, and appeared to be moribund. No abnormality was noted in the heart or lungs. The abdomen was greatly distended, but moved very slightly with respiration. No free fluid was demonstrable. The liver was not palpable, but there was a large hard mass extending from the left costal margin to the mid-line and downwards as far as the umbilicus. No splenic notch could be felt. The mass could not be moved about, but moved downwards slightly on deep inspiration. No enlarged lymph glands were noted.

Two days later the boy died and a *post mortem* examination was performed. The heart appeared normal. There were old fibrous adhesions between the parietal and visceral pleuræ over most of the right lung, but the lung tissue appeared to be normal. There were a few adhesions at the apex of the left lung and about 60 cubic centimetres (four ounces) of faintly blood-stained fluid were present in the pleural cavity. There was a small infarct on the posterior surface of the base of the left lung. The mediastinal lymph glands were slightly enlarged. In the abdomen there was a large mass attached to the lower pole of the spleen, extending downwards as far as the umbilicus. There were no adhesions between this mass and the parietal peritoneum. The mass, which was closely adherent to the spleen, involved omentum, the tail of the pancreas, and the left suprarenal gland and pelvis of the left kidney. It was firm, fairly vascular and friable, and contained some caseous material in its centre. The spleen was enlarged and showed several infarcts which bulged under the capsule. Section of these showed them to contain caseous material. The right kidney appeared normal, except for one small infarct near the upper pole. The left kidney was of normal size, with a capsule which stripped easily, and the kidney tissue appeared normal. At the pelvis of the kidney was a large pale mass, which protruded into the distended renal pelvis, but did not involve the ureter. The pre-aortic abdominal lymph glands were enlarged and firm. The liver, bladder, prostate, testes and blood vessels appeared normal.

Microscopic examination of the tissue at the renal pelvis, and of the omental mass, showed it to be a lymphosarcoma consisting of a mass of lymphoid cells, with no visible stroma in parts and in other areas of the section a very fine fibrillar stroma, and containing large numbers of blood vessels with thin walls, and blood spaces with no wall separating them from the tumour mass.

Microscopically the infarcts in the spleen suggested early metastatic tumours, but this was not absolutely certain. Unfortunately, the infarct in the right kidney and the pre-aortic lymph glands were not examined microscopically.

CASE X.—The patient, a male of about thirty years, complained of swelling in the neck for two years. On examination the lymph glands of the whole of the neck (anterior and posterior triangles, submaxillary and submental) were enlarged, hard, discrete, and not fixed to the skin or underlying structures. There were similar enlarged lymph glands in both axillæ. No enlarged lymph glands were palpable in the inguinal regions. No signs of gross intrathoracic involvement were found. There was marked bilateral exophthalmos, but no thyreoid enlargement or other evidence of toxic goitre was found. Blood examination showed a moderate degree of secondary anæmia, and a differential leucocyte count was as follows:

Neutrophile polymorphonuclear leucocytes	50%
Eosinophile polymorphonuclear leucocytes	10%
Large lymphocytes	11%
Small lymphocytes	14%
Large mononuclear and transitional cells	15%
Myelocytes	1 seen

No nucleated red blood corpuscles were seen, and no malarial parasites were found. A cervical lymph gland was removed for microscopic examination and the condition was diagnosed as Hodgkin's disease.

Under the low power there was a definite increase in thickness of the fibrous capsule surrounding the gland, which showed a very great diminution of the lymphoid tissue. There was a great increase in the fibrous tissue of the gland, in parts traversing it in the form of trabeculæ. The preponderating cell was large and appeared to be of the endothelial type. Round the periphery of the gland there were greater numbers of lymphocytes and the remains of some germinal centres, though all of these, especially towards their centres, showed changes similar to those in the centre of the gland. The normal distinction between cortex and medulla was lost. The blood vessel walls were thickened.

Under the high power it was seen that the fibrous reticulum of the gland was prominent, in some parts even amounting to definite fibrosis, with trabeculæ. The predominant cell was a large endothelial type, with well-staining nucleus and one or more prominent nucleoli. There were a few multinucleated giant cells resembling the "Dorothy Reed" cell, but these were scattered and not prominent. In appearance these cells were similar to the other endothelial cells, except that they were much larger and contained up to ten nuclei, arranged in some cases round the periphery, in others more centrally. They did not resemble the foreign body giant cells of tuberculosis, nor were any giant cell systems, such as are found in tuberculous adenitis, seen. The small areas in the remaining germinal follicles showed similar changes: loss of lymphocytes, increase in fibrous tissue, and proliferation of endothelial cells. There were no areas of definite necrosis, though in one or two places in the centre of the gland the staining was poorer than elsewhere, and the appearance suggested early necrotic changes. There were very few polymorphonuclear leucocytes present. The condition was considered to be Hodgkin's disease. Though a blood examination revealed a very definite eosinophilia, intestinal and other parasites which also give rise to eosinophilia are frequent in this locality. Unfortunately, the stools were not examined for protozoa or ova of intestinal worms, so that the blood count gives no definite evidence.

In sections of other cervical lymph glands examined, from cases considered clinically to be tuberculous, giant cell systems were usually very common, and softening and caseation frequent, though tubercle bacilli could not always be demonstrated. In the cases of tuberculous adenitis seen by me the patients were often found to have enlarged glands in all regions of the neck and both axillæ. The glands were usually matted together; in the majority of cases there were areas of softening, some patients having discharging sinuses.

So little work has been done amongst this primitive people that there is no published record of the reaction of the body, under conditions so different from those in more temperate climates and amongst civilized people, to infection with the tubercle bacillus. It is possible that the reaction to infection differs in some degree in these people from that in European countries, and further research on this subject might bring forward some interesting facts.

The difficulty, in the above case, of diagnosis between Hodgkin's disease and tuberculous adenitis, as seen in these people, is of especial interest, as many authorities hold that there is a close relation between tuberculous infection and Hodgkin's disease. Uts and Keatinge,[4] in a survey of the literature on Hodgkin's disease, mention authorities who hold that this disease is a form of atypical tuberculosis. Boyd,[5] who considers the condition to be a specific infective granuloma of unknown origin, considers the tubercle bacillus acting in an atypical way to be a possibility. Others consider that the lesions of Hodgkin's disease are favourable soil for tuberculosis, which in these cases is a secondary invader. Though the consensus of opinion today is rather against the *Bacillus tuberculosis* being the causative factor in Hodgkin's disease, the similarity of distribution of glands in this case and in cases of tuberculous adenitis in the same district, and also the microscopic appearances, are of interest.

CASE XI.—A small, cystic, subcutaneous tumour was removed from the forehead, about 2·5 centimetres (one inch) above the right eyebrow of an adult native woman.

This was found to contain some sebaceous material and hair. Microscopic examination showed the cyst to be lined by stratified epithelium, in which were numbers of hair follicles. Outside this epithelium was a layer of fibrous tissue, surrounded in turn by loose areolar tissue, with some muscle fibres. In the cavity of the cyst were portions of hair. The diagnosis was a dermoid cyst of the forehead.

CASE XII.—A native woman, about twenty-four years of age, was first seen when about five months pregnant and thought to have probably a hydramnios. When seen at about eight months it was found that she had a large ovarian cyst, the pregnant uterus being pushed over into the right iliac fossa. As it was impossible to be sure of the exact length of her pregnancy, she was kept in hospital.

Examination of the abdomen showed the pregnant uterus to be lying obliquely across the abdomen in the right iliac, lumbar and umbilical regions, the remainder of the abdomen being taken up by a tumour which gave a very obvious fluid thrill. The cyst appeared to be unilocular and, as it was considered to be too great a risk to do a Cæsarean section with only a very small hospital staff, the patient was left until labour commenced and the cyst was then tapped through the mid-line. About two gallons of straw-coloured fluid were drawn off, and as the cyst emptied the uterus swung across into the mid-line and the babe was born naturally.

The patient at the time refused further operation, but about three months later noticed her abdomen enlarging again, and returned to hospital, when the cyst was removed. The cyst was lying free in the abdominal cavity and appeared to be unilocular and thin-walled, with the left Fallopian tube stretched over and firmly adherent to it. The cyst and left tube were removed together. The right ovary showed several small cysts, but was not interfered with. The cyst at this time contained about three pints of fluid.

Examination revealed a large fibrous sac with papillary growths in one spot, close to the Fallopian tube. Microscopical examination showed the cyst wall to be composed of fibrous tissue. The papillary ingrowth consisted of a complex series of cystic spaces filled with mucinoid material and lined with cubical and columnar epithelium set on a well marked basement membrane. There were a few goblet cells. In many of these spaces there were numerous secondary papillary ingrowths. The stroma between the cystic spaces and in the papillary ingrowths was fibrous tissue with a few small blood vessels. The diagnosis was papillary cyst-adenoma of the ovary.

Summary.

1. Ten cases of proved malignant disease, a case of dermoid cyst, and one of ovarian cyst, occurring in full-blooded New Britain natives, are reported.

2. The composition of the betel "quid" is given, and its possible relation to epithelioma of the cheek is mentioned.

3. The frequent occurrence of tuberculous adenitis in this district of New Britain and the question of the importance of *Bacillus tuberculosis* in the ætiology of Hodgkin's disease are mentioned.

Acknowledgements.

My thanks are due to Dr. H. Champion Hosking, then Acting Director of Public Health in New Guinea, for making the X ray examinations and for the photographs; and to Dr. T. C. Backhouse, of the Public Health Department, Rabaul, for preparation of histological specimens.

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(3) Sabesan: *Madras Medical College Magazine*, 1928, quoted by Stewart.
(4) "Current Comment": "Betel-Nut Cancer", THE MEDICAL JOURNAL OF AUSTRALIA, January 1, 1932, page 17.
(5) L. Uts and Lelia Keatinge: "Hodgkin's Disease", THE MEDICAL JOURNAL OF AUSTRALIA, April 4, 1931, page 397.
(6) Boyd: "Pathology of Internal Diseases", 1931, page 658.

Reviews.

HEART DISEASE.

JUST twenty-five years ago James Mackenzie published his great book on diseases of the heart, in which he stressed the essential importance of the functional capacity of the heart muscle under strain and opened up a new outlook in the study of circulatory problems. Sir Thomas Lewis has been perhaps the foremost worker in this field during these twenty-five years, and the lesson which he teaches in this book is the same: that functional capacity is more important than structural perfection, and that the real test of a heart's efficiency is the work which it can do.[1]

Mackenzie had to use mechanical aids in proving his case and in demonstrating the types of arrhythmia *et cetera*, and these methods, especially since the introduction of the electrocardiograph, have become a fetish with many people and are regarded as the most important part of the examination, or as a final court of appeal. Sir Thomas Lewis, the leading British worker in this field, makes very little use of such methods in his book and shows clearly that, though helpful and important in some cases, they are rarely essential.

The book contains an amazing amount of information in a small compass, and is easy to read. There is no discussion of disputed points or of difficult physiological or pathological matters, but a clear, dogmatic statement of the author's view on the subject.

The normal heart and its response to strain, the effects of disease, either of the heart or other parts of the organism on this response, and the nature and recognition of heart failure are treated in an interesting and convincing manner, while the treatment of heart failure is simply and thoroughly discussed.

The author is definitely opposed to the use of the fashionable large doses of digitalis, which have caused so much discomfort, if not danger, to patients in Australia of recent years.

The chapters on myocardial changes and unexplained heart failure are of exceptional interest, while coronary thrombosis and *angina pectoris* are dealt with thoroughly in wonderfully few pages.

It is hardly necessary to say more than that the book is worthy of its author's reputation, and should be in the possession of every medical student and practising physician.

PRACTICAL OPHTHALMOLOGY.

THE small book of clinical ophthalmology for house surgeons and students by J. Myles Bickerton and L. H. Savin is ideal for its purpose and should find its way into the hands of most students.[2]

It is very easy to read, being well arranged, and the subject is admirably covered without over much detail being given. Many of the well known illustrations in Swanzy's "Diseases of the Eye" have been borrowed and these, with several good plates, make excellent support for the text.

Many practical hints are available for house surgeon or general practitioner.

We should like to have seen a little more stress laid on the differential diagnosis of iritis, glaucoma and conjunctivitis. Although these subjects are well discussed separately, that is not sufficient to bring home the salient

[1] "Diseases of the Heart, Described for Practitioners and Students", by Sir Thomas Lewis, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P.; 1933. London: Macmillan and Company, Limited; Australia: Angus and Robertson. Royal 8vo., pp. 317, with illustrations. Price: 12s. 6d. net.

[2] "Clinical Ophthalmology for House Surgeons and Students", by J. M. Bickerton, M.A., B.Ch., F.R.C.S., and L. H. Savin, M.D., M.R.C.P., F.R.C.S.; 1933. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 165, with 92 illustrations. Price: 7s. 6d. net.

features to the inexperienced. Specialists are constantly meeting with the tragic results of faulty diagnosis in these conditions.

We regret to see that the use of Bowman's probes is still advocated in the treatment of chronic dacryocystitis. That valuable olivary pointed gold needle made by Burroughs Wellcome and Company to fit an ordinary record syringe is worthy of mention in their stead, especially for the treatment of dacryocystitis of infants.

The strength of "Novocain" for use in local anæsthesia for such minor operations as dacryocystectomy is unfortunately given at 1%, when 2% and even 4% solutions are not accompanied by any greater risk, while the added comfort to patient and therefore to operator is a feature not to be forgotten when once experienced.

These minor criticisms do not detract from an otherwise excellent book which will appeal to the student because of its relatively small size.

TALKS TO MOTHERS ON THEIR BABIES.

A COLLECTION of short wireless talks, entitled "A Doctor to a Mother", by Dr. Eardley Holland, Dr. R. C. Jewesbury and Dr. Wilfrid Sheldon, is an excellent little booklet for mothers.

The language used is simple and clear, and mothers will get just the information they require without a great deal of elaborate and technical advice. The subjects covered in the lecturettes are ante-natal care, the care of the normal baby, the diet of the toddler, the treatment and prevention of nervous disturbances, minor ailments of children, and general hygiene.

Dr. Jewesbury is somewhat over-careful in the preparation of milk foods when he recommends that for children up to the age of eleven months all milk puddings should be sieved; also most Australian practitioners give children semi-solids at six months of age, rather than wait until nine months.

However, the book is one that all mothers should have. There would be fewer mishandled, spoilt children if its directions were followed. The chapters covering milestones of development, disturbances of sleep and prevention of nervous disorders are particularly well expressed and give information not often supplied in books dealing with infant welfare.

ELEMENTARY PHYSICS.

IN his book on elementary physics, Mr. Edgar Booth, of the University of Sydney, gives an elementary treatment of mechanics, hydrostatics, pneumatics, heat, light, sound, electricity and magnetism, that is, of all the subjects important to those beginning the study of physics.[2] The author explains in the preface that he has not attempted to write an exciting book dealing with modern applications of physics. Experienced teachers will certainly agree that he shows sound judgement in not doing so, as the inclusion of such matter is generally at the cost of a thorough treatment of the important principles of physics.

The book before us is an experimental one, and the first section, which forms rather more than one-fifth of it, describes a number of simple experiments and measurements to be made by the student. In this the sound principle in teaching, of proceeding from the concrete to the abstract, is followed. The author has an interesting style, which is nowhere better shown than in this introductory section. We are glad to see that the author is not afraid to discuss and to attempt to interest his readers in the question of accuracy in measurement. What a great place the study of physics would be able to claim in education if such teaching inculcated life-long habits of accuracy in thought and statement in those who study it!

Many modern texts on physics give an increasing attention to the history of physics and to the lives of the pioneers of the subject. This forms a considerable improvement on the older teaching, which often tended to be uninteresting and too technical for many of those who had to study it. Historical matter gives human interest to any science and makes it, as a subject of study, more cultural than a science which is taught as though it were complete and final in its development.

Mr. Booth gives at the end of the section on mechanics a short chapter on the history of physics and astronomy, and in other places in the book historical matter is to be found. Teachers of those who are beginning the study of physics have now a wide choice of text books. English, Canadian, and American writers have all essayed the task of producing such texts. We believe that the book under review compares very favourably with these other texts in its happy combination of experiment with the exposition of the principles of physics, in being interestingly written, and, above all, in having, so far as an elementary book can have it, something of the true scientific spirit.

CHILDREN'S DISEASES.

IN the preface to his book, entitled "Diseases of Children", Bruce Williamson states that he has aimed at a "short but complete account of the diseases and disorders of infancy and childhood".[1] In this he has admirably succeeded, for in a book of less than three hundred pages he has given a thoroughly up-to-date account of the rare as well as the commoner diseases of childhood.

The book is novel in that the customary description of the normal child at the beginning of the book is omitted, and, instead, a short description of the normal is used as an introduction to each system.

The book is mainly written from the standpoint of the clinician. The description of the clinical examination of the respiratory and cardiac systems is excellent and the chapters devoted to these systems are the best in the book.

We know of no book with better illustrations. At the end of the book is "a formulary of well tried prescriptions". The doses seem often to be unduly large, and in some cases must be intended for single doses. For example, the dose of paregoric during infancy is set down as one minim for each month; that is, the dose for an infant of twelve months would be twelve minims which many would baulk at giving.

There are one or two other points with which we are not in agreement. A distinction is drawn between achalasia and congenital pyloric hypertrophy, whereas the latter is probably secondary to the former. Local application of borax and glycerine, which is a slow poison, is recommended in the treatment of stomatitis. The chapter on infant welfare and dietetics is too brief to do justice to the subject. In reference to infantile paralysis, greater insistence should be made on the recognition of the symptoms of the preparalytic stage, the examination of the cerebro-spinal fluid, and the early use of convalescent serum, with special reference to the mode of introduction of the serum and the dosage.

Nevertheless, the book is destined to be popular with the young practitioner and with the student.

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[1] "A Doctor to a Mother: The Management of Maternal and Infant Health", by E. Holland, M.D., F.R.C.S., F.R.C.P., F.C.O.G., R. C. Jewesbury, M.D., F.R.C.P., and W. Sheldon, M.D., M.R.C.P.; 1933. London: Edward Arnold and Company. Crown 8vo., pp. 96. Price: 1s. 6d. net.

[2] "An Elementary Introduction to Physics, Descriptive, Experimental and Historical", by E. Booth, M.C., B.Sc., F.Inst.P.; 1932. Sydney: Australasian Medical Publishing Company, Limited; London: H. K. Lewis and Company, Limited. Crown 8vo., pp. 465, with illustrations. Price: 5s. 6d. net.

[1] "A Handbook on Diseases of Children, Including Dietetics and the Common Fevers", by B. Williamson, M.D., M.R.C.P.; 1931. Edinburgh: E. and S. Livingstone. Crown 8vo., pp. 302, with illustrations. Price: 10s. 6d. net.

The Medical Journal of Australia

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TOTAL AND SUBTOTAL HYSTERECTOMY.

THE operation of hysterectomy must be regarded as one of the major surgical procedures. It is undertaken for the relief of several conditions; the two that come most readily to mind are fibroid tumours and malignant growths of the uterus. There are two types of hysterectomy in common use, the subtotal or supravaginal, and the total operation, in which the body of the uterus together with the whole of the *cervix uteri* is removed. In ordinary circumstances, when the uterus is not greatly deformed by fibroid growths, the subtotal operation is a relatively simple procedure; the complete operation is more difficult. For experienced surgeons there is, as a rule, no great difficulty in performing the complete operation; difficulty comes to the inexperienced owing to the intimate relationship between the cervix and the bladder and ureters.

As far as malignant disease is concerned, the question of subtotal hysterectomy may be dismissed, for surely no operator, experienced or inexperienced, would dream of removing by supravaginal amputation a uterus known to be malignant. Those who perform the operation of hysterectomy may be divided into three groups. The first includes the would-be surgeon, the occasional operator who "does his own surgery"; he probably chooses the subtotal operation because it is not particularly difficult. For the moment this type of practitioner may be disregarded. The other two groups include surgeons who hold that subtotal operation is suitable for certain cases, and surgeons who believe that the complete operation should always be chosen. Surgeons who choose subtotal hysterectomy for such a condition as fibroids of the uterus claim that the operation carries a lower mortality than the total operation, that the operation may be rapidly performed and is accompanied by less shock, that there is less blood loss, that the vagina is not shortened, and that the conformity of the vaginal vault is maintained. The advocates of total removal as a routine measure point out that after subtotal hysterectomy an infective cervix is often left as a source of trouble and as a possible danger. An infected cervix will tend to keep up any vaginal discharge that is present, and the infection, by spreading along the adjacent lymphatic vessels, may cause a parametritis. The chief reason for the uncompromising attitude of the total removalists, however, is the possibility of the occurrence of cancer in the remaining cervical stump. This is the crucial question.

Polak discussed the development of cancer in the cervical stump in 1920 in *The Journal of the American Medical Association*. He collected records of 256 cases of cancer of this type. Of 215 cases of cervical carcinoma seen by Graff, 17, or just under 8%, occurred in a cervical stump left by subtotal hysterectomy. Polak refers to an observation by Schottlaender, Spencer and Noble on 900 total hysterectomy operations; cancer of the cervix was found to accompany more than 2% of all fibroid tumours of the uterus. Statistics need not be multiplied. Perusal of current medical literature would seem to indicate that surgeons the world over are adopting the uncompromising attitude of the total removalists. If total hysterectomy is performed by a skilled surgeon, the mortality will not be high. Polak in 1920 claimed that his mortality rate after the total operation was only 0·5% higher

than after the subtotal. Even the most expert exponents of the subtotal technique could not wish for better results than are claimed by Worrall after his operation of complete hysterectomy. A critic who was not satisfied in regard to mortality might be inclined to grant that subtotal hysterectomy was justifiable in the hands of a trained gynæcological surgeon who selected his patients for operation after careful study of the tumour, of the condition of the cervix and of the age of the patient. Such a critic might, and possibly would be, able to put up a good case. At the same time the weight of present day responsible opinion would be against him. One disadvantage of allowing selection of cases for subtotal hysterectomy is that all surgeons who perform hysterectomy are not trained gynæcologists. On the whole, we must conclude that Spencer was right when he said that it is an opprobrium to gynæcology that cancer of the cervix should ever be left behind as a result of an incomplete technique.

We have not forgotten the occasional operator. Obviously he must be deleted from the picture altogether. He must not include hysterectomy in his list of operations. If he must attempt surgery (and there seems to be no way of stopping him), he should confine his activities to procedures in which he will not inflict unnecessary injury on his patient.

Current Comment.

POVERTY AND HEALTH.

THE preservation of health, particularly at the present time, is an economic as much as a medical problem. It depends largely on an adequate supply of suitable nourishment. Continued under-nourishment is hard enough on the strong and healthy; it is gravely dangerous to the very young, the weak, the sick, those with latent disease *et cetera*. Every medical practitioner has seen its effects, whether or not he has recognized them as such. The rates of invalidity and mortality among these under-nourished people must have been higher during the past few years than they would normally have been; but they are unlikely to have been as high among average Australians as among the people of slums in the dim and often fog-begrimed cities of some other countries. The influence of poverty and malnutrition on the health of a section of the inhabitants of an English industrial town is discussed in a recent interesting communication by G. C. M. McGonigle, the Medical Officer of Health at Stockton-on-Tees.[1] In 1927 an unhealthy area (known as the Housewife Lane area) in the town of Stockton-on-Tees was demolished and its 710 inhabitants were moved to the Mount Pleasant area, consisting of modern houses specially built by the municipal authorities. "From a hygienic and environmental point of view the new estate appears to be everything that modern sanitary science can demand." Another unhealthy area (Riverside), with 1,298 inhabitants, remained untouched by the hand of progress; it served as a suitable control area. A study of the vital statistics revealed the surprising fact that the mean crude death rate *per mille* in the Mount Pleasant area from 1928 to 1932 was 26·71 *per annum*, though from 1923 to 1927 it had been 18·75 in the Housewife Lane area; from 1923 to 1927 the mean rate in the Riverside area was 22·16, and from 1928 to 1932, 20·45; during the same periods the mean rates for the whole of the town were 13·96 and 13·28 respectively. The mean standardized death rates were even more remarkable, rising from 22·91 *per annum* in the Housewife Lane area during the period 1923 to 1927, to 33·55 in the Mount Pleasant area during the period 1928 to 1932; at the same time the rates for England and Wales, Durham County and Stockton-on-Tees decreased slightly, while the rate for the Riverside area decreased from 26·10 to 22·78.

An interesting fact was that the mean birth rate *per mille* rose from 35·08 in the Housewife Lane area to 44·25 in the Mount Pleasant area; at the same time the rate decreased in the Riverside area from 36·51 to 32·02; there was also a decrease in the birth rate for England and Wales, Durham County and Stockton-on-Tees. The suggestion was that the increased birth rate in the Mount Pleasant area may have been accompanied by an increased infantile mortality rate; but investigation revealed that the infantile mortality rate, though considerably higher than the rate for the whole town, was lower than the rate for the Riverside area and much lower than it had been during the previous period of five years in the Housewife Lane area.

The list of possible causes of the increased mortality rate in the Mount Pleasant area, of course, could not include such environmental factors as bad housing, faulty drainage, overcrowding, and insanitary conditions generally; these conditions did not exist.

McGonigle made a careful investigation of the receipts and expenditure of a number of families in the Mount Pleasant area and the Riverside area, and he came to the conclusion that the inhabitants of the former had insufficient funds for the purchase of adequate supplies of food. The interesting fact emerged that the increased rental for houses in the Mount Pleasant area, as compared with that in the Housewife Lane and Riverside areas, was largely responsible. The rent had been low enough (4s. 8d.

[1] *Proceedings of the Royal Society of Medicine*, April, 1933.

a week) in the old Housewife Lane area, and it was low enough (4s. 10d. a week) in the Riverside area; but in the Mount Pleasant area it amounted to the princely sum of 8s. 10d. McGonigle found that among the employed in the Mount Pleasant area the average amount available for the purchase of food per man was 62·6 pence, and among the unemployed 34·7 pence; in the Riverside area the figures were 51·5 and 45·6 respectively. It should be remembered that the majority were unemployed. In making the calculations, the food requirements of a man, or a boy aged fourteen years or more, were regarded as unity, and those for adult females, very old people, and other children as fractions, according to age. It was found that the food supply of the employed in the Mount Pleasant area was considerably, and in the Riverside area slightly, above requirements in calorific value, but considerably below requirements in protein content. The unemployed in the Mount Pleasant area had a diet that was not of sufficiently high calorific value and was sadly deficient in protein content. The unemployed in the Riverside area were not so badly off; their diet was inadequate, though considerably richer in protein than that of the unemployed in the Mount Pleasant area. The figures, of course, represent averages only; some families had considerably less food, and must have been in a condition of semi-starvation. Lack of proper nourishment was the only cause that could be found for the deterioration in health of the Mount Pleasant residents.

This is a remarkable and instructive story, exemplifying one of the many problems facing health authorities when they make revolutionary changes in the living conditions of a community. A man may be clothed in fine raiment and be given a palace to live in; but, if his belly remains empty, he will die in his palace, fine raiment and all.

THE MEASUREMENT OF THE RED CORPUSCLES.

It is a well established fact that important characteristics of pernicious anæmia are anisocytosis and an increase in the average size of the red corpuscles. Several methods have been devised for estimating the degree of these changes. Perhaps the simplest method is that described by Pijper in 1929; this depends on the diffraction of light rays passing through a dry blood smear. Pijper points out that the smear acts as a sort of diffraction grating. The rays, after they have passed through the smear, are collected by a convex lens and thrown as a series of concentric spectra on a ground glass surface at the focal plane of the lens. The diameter of the cells can be calculated from the diameter of the coloured rings; but for practical purposes the estimations are made by comparison with the spectra thrown by a standard normal blood smear. The average diameter of all the red corpuscles and the diameter of the largest and smallest corpuscles present in sufficient number to produce visible colours can be readily estimated by means of Pijper's instrument. The method has not come into general use, partly, no doubt, because it depends on optical phenomena that are not easily explained and, as a consequence, are understood by very few. A new method, which is even simpler in application than Pijper's, has recently been described by J. Vincent Falisi.[1]

The principle of this method also is the diffraction of light passing through a dried blood smear. An advantage is that very little apparatus is required beyond that in the possession of most medical practitioners. A small horizontal stage, fitted with a vernier scale and thumb-screws, is fixed to the upper end of a microscope tube after the eye-piece has been removed. A glass slide, on which a blood film has been spread, is placed, film downwards, on the stage. The sub-stage condenser of the microscope is replaced by a light, with a small aperture above it; one objective lens is removed, so that the light shines directly upwards through the microscope tube. The observer looks downward through a small aperture in a tube above the blood slide. Concentric circular spectra are seen and can be measured by means of the vernier scale. The average diameter of the red corpuscles in the film can be calculated from the diameter of one of the coloured circles of the spectra. Falisi shows that the approximate diameter of the red cells can be expressed by the formula $\frac{LAB}{R(A+B)}$, where L = the wave length of the light (red is the one used by Falisi), A = the distance between the observing aperture and the smear, B = the distance between the illuminating aperture and the smear, and R = the radius of the coloured circle. Tables can be drawn up to obviate the necessity for making a calculation each time a measurement is taken. Poikilocytosis is recognizable by an absence of the clean-cut appearances of the spectra produced by normal blood. Falisi found that the figures obtained by the use of his method differed but little from those obtained by the photographic method.

It is unfortunate that Falisi gives a very poor description of his apparatus—so poor indeed that it can scarcely be called a description. His explanation of the physical phenomena concerned is also inadequate. As a matter of fact, after a few minutes' experimentation, the rings can be seen quite well through the tube of a microscope, without any additional apparatus. A method of measuring them could readily be devised. With a little adjustment and the incorporation of a measuring device almost any sort of tube of about the same bore as a microscope tube could be used successfully.

The method has obvious advantages over others in vogue, and might well be tried by those who believe in the value of estimating the average size of the red corpuscles. Falisi proposes to give his instrument the title "microdiffractometer"—a term which is a monstrosity as well as an absurdity.

[1] *The American Journal of the Medical Sciences*, July, 1933.

Abstracts from Current Medical Literature.

RADIOLOGY.

Radiological Appearances of the Lungs in Gastro-Intestinal Conditions.

E. KOPPENSTEIN (*Münchener Medizinische Wochenschrift*, February 3, 1933) found in 2,000 patients whose gastro-intestinal tracts were examined by X rays because of gastro-intestinal symptoms, that 17·5% had lesions in their lungs. These included calcified tuberculous foci (primary), calcified glands or thickened pleura. In another 7% of the cases uncalcified and clinically unnoticed parenchymatous lung changes were found. Among 390 patients with ulcers, 6·9% showed uncalcified parenchymatous lung changes, and this percentage was also seen in 1,610 cases of gastro-duodenal disease (excluding ulcer). A careful Röntgenographical examination of the chest should always be made in investigating symptoms of intestinal disease.

Röntgenological Studies of the Intervertebral Disk.

E. L. COMPERE AND D. C. KEYES (*American Journal of Roentgenology*, June, 1933) discuss the embryology, anatomy, physiology and clinical experimental pathology of the intervertebral disk. The adult intervertebral disk is made up of three components: the *annulus fibrosus*, the *nucleus pulposus*, and two thin cartilage plates which overlie very thin layers of cortical bone of the vertebræ and confine the *nucleus pulposus* above and below. The *nucleus pulposus* is a fibro-gelatinous material subject to the laws of fluids. It may be considered, therefore, incompressible and confined to its normal shape and position by the strong and elastic *annulus fibrosus*. This incompressibility lends to it the function of transmitting the static and muscular forces from one vertebral body to the next, and establishes it as the axis of motion upon which each vertebral body must work. Any pathological process which weakens the structures confining the *nucleus pulposus*, invades the nucleus itself, or merely allows portions of the nuclear material to escape, will interfere with the normal function of the spine. The commonest lesion of the spine is prolapse of the *nucleus pulposus* into the spongiosa of the vertebral body. The mere presence of these cartilaginous nodules may not cause pain in the back. The nuclear material is extruded through a crack or other defect in the cartilage plate into the spongy bone by the force which is transmitted to that disk by the weight of the body and by the tone of the spinal muscles and ligaments. As a result of this invasion a reaction is set up in the bone. The semi-fluid material is transformed into a cartilage nodule, and the bone about it becomes sclerosed, forming a secondary line of defence to wall off the invading material. This sclerosed bone around the nodule may be noted in the Röntgenograms, but until sufficient time has elapsed following the prolapse of the nuclear material of the disk for the reaction in the bone to take place, the Röntgen diagnosis usually cannot be made. If only a small portion of the *nucleus pulposus* is extruded, the function of the intervertebral disk may not be seriously affected, and no immediate disability would be expected. The extrusion, however, of even minute portions of the semigelatinous *nucleus pulposus* may open avenues for dehydration of the disk and hence diminished function at an earlier age than that at which such changes normally occur. Such small ruptures may thus be a predisposing ætiological factor in the development of arthritis of the spine years later. If a considerable portion of the semi-fluid material escapes either into the spongy bone or through the fibres of the *annulus fibrosus*, the weight of the body and the trauma of everyday life can no longer be transmitted from one vertebral body to the next through this semi-fluid cushion, but must be borne in part by the fibro-cartilaginous *annulus fibrosus*. The intervertebral disk then becomes thinner and in some instances completely wears out. When the *nucleus pulposus* has been destroyed, the axis of motion is shifted posteriorly to the articular facets, and the weight of the body, especially in all forward or lateral bending, is transferred to the lateral or anterior portion of the vertebral bodies themselves. As a result of this, the adjacent parts of the vertebræ may become sclerosed and the lipping and spurs characteristic of osteoarthritis of the spine will be noted in the Röntgen examination.

Differentiation of Lesions of the Right and Left Sides of the Heart.

LEO G. RIGLER (*Radiology*, June, 1933) considers that too little attention has been given to the increases in size which may take place in individual chambers of the heart. The value of lateral views which might demonstrate enlargement of the posterior chambers, the left atrium and left ventricle has not been emphasized, probably because of the difficulty in interpretation. Ordinarily, the distinction between those lesions which primarily affect the left ventricle, such as aortic valvular disease and hypertension, and diseases of the right side of the heart is comparatively simple, both clinically and Röntgenologically. In mitral disease, however, this differentiation is often difficult. From the standpoint of the pathological physiology of the heart, one of the most essential differences between these two groups of cases lies in the presence or absence of enlargement of the left atrium. It is always enlarged in mitral disease with symptoms of cardiac embarrassment, while in right heart lesions it is never enlarged. The first effect of mitral stenosis upon the heart is left atrial hypertrophy and dilatation. In the case of mitral insufficiency the left ventricle may possibly be affected first to a slight degree, but the left atrium follows shortly. If the patient is presenting any symptoms of cardiac failure, no matter how slight, due to mitral disease, enlargement of the left atrium must already have taken place. In the right heart lesions the whole process takes place on the other side of the pulmonary circulation and the left atrium is usually undisturbed. The determination of whether or not the left atrium is enlarged is important in those persons without organic heart disease who have symptoms which simulate cardiac failure, who often have a systolic murmur at the apex, and in whom, in some cases, the teleoskiagrams suggest the appearance of a mitral heart. Normally the size is well within normal limits, but the contour may resemble that of mitral stenosis. In these cases one may see a marked convexity of the left median curve without enlargement of the transverse diameter on the surface area of the heart. The absence of demonstrable enlargement of the left atrium, while it would not rule out mitral disease, would indicate definitely that the apparent symptoms of cardiac embarrassment could not be due to myocardial failure of mitral origin. On the other hand, if the left atrium is shown to be enlarged, the diagnosis of mitral disease is definitely clinched. The utilization of the barium-filled œsophagus to demonstrate the enlarged left atrium is an effective and comparatively accurate method. Compression and displacement of the œsophagus posteriorly and to the right occur at an early stage in the enlargement of this chamber. If the proper technique is used, this displacement, in most cases, is readily seen and is simulated only by a few easily demonstrable conditions. A postero-anterior view will show the deviation of the œsophagus to the right, while a true lateral view with the right side against the film will demonstrate any posterior displacement. Occasionally a displacement is seen in diffuse cardiac dilatations, such as occur with pericarditis, the toxic or fibrotic myocardium, and in the late stages of hypertension or aortic valvular disease. A complete absence of displacement of the œsophagus may occur in mitral disease, but only when there are no cardiac symptoms.

Kienbock's Disease of the Semilunar Bone of the Wrist.

CARL L. GILLIES (*American Journal of Roentgenology*, July, 1933) discusses Kienbock's disease, an isolated degenerative disease of the semilunar bone of the wrist. Films of the affected wrist show an increase in density of the semilunar with loss of the normal bony trabeculations. Small wavy lines of rarefaction running in a transverse direction are usually

present, producing the appearance of fragmentation. The proximal articular surface is irregular and deformed, whereas the distal surface is smooth and of normal shape. The lateral view is very important, and shows, in addition to the increase in density, a change in the contour of the bone. The normal crescentic shape is lost, the superior and inferior surfaces being more nearly parallel, with a resulting loss of volume. The Röntgen findings are unchanged years afterward. The appearance of the bone seems to bear no relation to the patient's subjective symptoms. While in a certain number of cases no history of adequate trauma can be obtained, trauma undoubtedly plays a very important part in its production. This may take the form of trauma brought about by special and abnormal anatomical conditions, or by continual small compression injuries in special occupations, or by a single severe compression injury. The infectious theory as a causative factor cannot be ignored.

PHYSICAL THERAPY.

Irradiation Therapy of Hodgkin's Disease.

R. CULVER AND F. SLUYS (*Journal de Radiologie et d'Electrologie*, March, 1933), in a very long article with an extensive bibliography, put forward the value of irradiation in lymphadenoma. As contraindications to treatment by X rays, they mention concurrent pyrexia and tuberculous foci. They are also wary of using irradiation when any extensive renal trouble is present, and they lay much stress on avoiding the abdomen in cases of pregnancy. The authors quote two striking cases, in both of which the glands were pathologically examined; one was a case of nineteen years' and the other a case of seventeen years' duration. In the former the patient had one recurrence nine years after the first treatment; the second patient returned for treatment six times during the above period.

Treatment of Carcinoma of the Thyreoid Gland.

JOHN DE J. PEMBERTON AND ROBERT E. FRICKE (*Radiology*, March, 1933) state that carcinoma of the thyreoid gland is a highly fatal form of malignant disease, most difficult to diagnose clinically; and owing to the proximity of the gland to large blood vessels and lymphatic structures, widespread metastasis is common, usually terminating the picture. Four main types of carcinoma are described histologically: (i) papillary adenocarcinoma, (ii) adenocarcinoma in adenoma, (iii) diffuse adenocarcinoma, and (iv) spindle-cell carcinoma resembling sarcoma. The prognosis varies and the types are named in approximately ascending order of malignancy. Treatment is given as consisting of operation only, irradiation only, or a combination of the two. Irradiation only is described as a poor policy unless the growth is so extensive as to be totally inoperable; then, with irradiation only, palliation usually can be secured, and even cure in the occasional case (10% of the authors' medical series). Surgery only is not justifiable, even if the carcinoma is entirely removed. The facts that most carcinomata of the thyreoid gland are of low grade malignancy and that, in an appreciable percentage of cases in which operation cannot be performed, irradiation is followed by cure are evidence that these growths are sufficiently radiosensitive fully to warrant postoperative treatment. Because of the frequency with which carcinoma of the thyreoid gland develops in a preexisting nodular goitre and the difficulty of distinguishing carcinomata in their early stages from benign tumours, surgical removal of all nodular goitres should be considered the treatment of choice, together with post-operative irradiation whenever carcinoma is found.

Reduction of Turbinate Tissue by Diathermy.

FREDERICK L. WAHRER (*Archives of Physical Therapy, X-Ray and Radium*, April, 1933) states that there are a large number of patients in whom the turbinate tissue will not respond to ordinary treatment, and that for many years removal of the excess turbinate tissue was in vogue. He considers that this brought good results when there was enlargement of the middle turbinate, but when the inferior turbinate was removed the cures proved worse than the disease, crusting and excessive dryness of nose and pharynx being caused. The author's method is to use a high degree of medical diathermy. The technique of this treatment is as follows. After cocainizing the turbinate an indifferent electrode is placed on the patient's back and the active electrode placed on the turbinate to be treated. This is designed to fit along the convex edge and surface of the bone. A current of about 800 to 1,000 milliampères is required for about four to five seconds, and the electrode can then be removed to another portion of the turbinate and the treatment repeated. This procedure is carried out two or three times. The author claims that lymph spaces are dried up, the connective tissue cells are softened and diminished, the metaplasia of the mucous membrane is reduced, and the epithelial layers show a return to normal. The results are stated to be more satisfactory when applied to the inferior than to the middle turbinate. After three months additional treatment may be of benefit, especially when the middle turbinate is involved.

Irradiation of Bone Tumours.

GEORGE E. PFAHLER (*The American Journal of Cancer*, June, 1933) classifies bone tumours from the point of view of treatment as follows: (1) Metastatic tumours primary in tissues other than bone (breast, thyreoid, prostate, stomach, uterus); for these the author gives irradiation. (2) Periosteal fibrosarcoma; irradiation is given, perhaps followed by amputation. (3) Osteogenic tumours. (*a*) Benign; excision is used. (*b*) Malignant (periosteal, medullary and subperiosteal, sclerotic, telangiectatic sarcomata); irradiation is given, possibly followed by amputation. (4) Inflammatory conditions; irradiation is used unless pus or necrosis is present, when surgical intervention must not be delayed. (5) Benign giant-cell tumours; irradiation is the treatment. (6) Angiomata. (*a*) Benign; surgery is used. (*b*) Malignant; irradiation is used, probably followed by complete excision or amputation. (7) Ewing's sarcoma; irradiation is used. (8) Myeloma; irradiation is used. The author states that in the treatment of bone tumours no absolute rule can be laid down as regards irradiation therapy, but he is convinced that 200 kilovolts and filtration with up to two millimetres of copper are essential. He insists that in giant-cell tumours and metastatic carcinomata it is necessary to preserve the osteoblasts and to obtain bone repair as soon as possible. The bone tumours responding to irradiation are placed in the following order: Hodgkin's disease, endothelioma, giant-cell tumours, metastatic carcinoma, osteogenic sarcoma.

The Radiotherapy of Hodgkin's Disease.

R. GILBERT AND F. SLUYS (*Journal de Radiologie*, March, 1933) state that irradiation is the treatment of choice for lymphadenoma. They give a description of the histology after short wave X irradiation. They condemn all irradiation generated by less than 180 to 200 kilovolts and suggest that the reason in the past for so many failures is that the field beyond the actual group of lesions is not irradiated; therefore, they suggest the use of bigger fields. The technique given is 200 kilovolts, two to four milliampères of current, according to the type of apparatus, filtration 0·5 to 1·0 millimetre of copper and 1·0 millimetre of aluminium. The authors vary the focal skin distance according to the depth and surface area of fields to be treated. They give 700 *r* to 1,100 *r* as being sufficient to destroy superficial glands in one area. For mediastinal involvement 4,000 *r* is given over four fields receiving 1,000 *r* each. Only 170 *r* is given daily, or sometimes twice daily. The authors do not give a further course unless clinical evidence warrants it. A few notes are given on teleröntgen therapy, and the authors state that only 10 to 30 *r* should be given at one sitting when the focal skin distance is about 1·5 metres or more. Radium therapy is of use only when the patient cannot be moved. The authors conclude their article by emphasizing the point that radiotherapy will prolong the lives of these patients to a considerable extent if the methods and technique be correct.

Special Articles on Treatment.

(Contributed by Request.)

XVII.

THE TREATMENT OF CHRONIC NEPHRITIS.

CHRONIC NEPHRITIS is one of the most difficult and very often one of the most disappointing conditions with which a practising physician has to deal. It is unfortunate that chronic nephritis lends itself very poorly to any accurate or even dogmatic treatment, because the knowledge that the disease has reached a stage of chronicity very often gives the therapeutist a feeling of hopelessness which is harmful both to himself and to the patient. It would be a very pleasant prospect if it were possible to imagine that chronic nephritis could be cured by any tedious or lengthy experiment, but one has to admit that most patients are either limited in their expectation of life or doomed to an early extinction. It would be a very fine gesture on the part of the public health authorities if they were able to indicate some means by which nephritis of any kind could be prevented, and it would further absolve them from the accusation of a serious dereliction in duty if they could indicate some means of prophylaxis. There exists in the minds of a great many people an idea that nephritis is the result of neglect—neglect either on the part of the individual who contracts it, or neglect on the part of the medical profession who allow them to contract it and develop it, to the destruction of the individual. In Queensland there is an hypothesis that a great many cases of nephritis are due to lead poisoning, so-called lead nephritis, and there is something to be said for the zeal, enthusiasm and pertinacity of those protagonists of this theory.

It is common to regard nephritis in young children in a great many cases as being due to absorption of lead from the paint of houses in Queensland, but as far as I am aware it has never been convincingly proved that such is the case, and as far as I know there is no adequate experimental evidence to support the assumption that these cases are due to lead poisoning. Quite recently one of my colleagues told me that he had records of eight hundred cases in which lead had been found in the urine, and in none of these cases was there any evidence of nephritis. It is, however, a fact that chronic nephritis does occur at an early age amongst the denizens of Queensland, but there is considerable work to be done before it can be accepted as established or proved that these cases are due to plumbism. If the establishment of plumbism as a cause of nephritis were proved a scientific fact, then the prophylaxis of nephritis in children in Queensland could be obviated by a mere stroke of the legislative pen, that is, by definitely and irrevocably abolishing the use of lead paint on houses in Queensland. We will have to call, however, more and incontestable scientific evidence before the authorities can be arraigned on what appears to be in the minds of some a criminal neglect.

Further prophylactic measures can be undertaken in cases of children where definite infection exists, in tonsils which ought to be removed, in adenoids and in carious or infected teeth, but a word of warning ought to be sounded so that suppositious foci of infection are not removed from innocent mouths and throats. Particularly would one say that wholesale and indiscriminate removal of teeth without evidence of guilt, just because they are suspected, is to be condemned.

There seems to be in my experience quite definitely a familial tendency to nephritis, and I think that in these cases, when one is certain that the stock are born with kidneys susceptible to kidney infection, the very greatest care should be taken to remove all possible foci of infection, and the greatest check should be made on the possible development of nephritis with intercurrent diseases.

There are really, broadly speaking, only two classes of chronic nephritics which are worth considering, and they are those who are chronic nephritics with œdema and those who are chronic nephritics without œdema. It so happens at the moment of writing that I have under my care in the Brisbane Hospital in my male ward seven patients with chronic nephritis, and of these five are of the type of chronic nephritis with œdema.

Chronic Nephritis with Œdema.

I will deal first of all with the treatment of chronic nephritis with œdema. The whole principle in these cases consists in the reduction of the fluid intake without embarrassment of the patient's comfort, and to encourage the elimination of fluid by the various avenues available. The kidneys, the skin, the intestine and the lungs are all to be used, and the stimulation of these portals of elimination is the aim of the therapeutist. For the purposes of diuresis many drugs have been claimed as successful, but amongst the few theo-bromine sodium salicylate has been vaunted as successful. It certainly is useful in some cases. Digitalis I have found of very little use, and calcium is one of the drugs which I have found to be effective. It has to be given either as a lactate or chloride in large doses, 12 cubic centimetres (three fluid drachms) or more a day, and continued for three weeks, the urine output being measured daily. The new diuretics, "Novasurol" and "Salyrgan", are strongly recommended by their protagonists, and it really is very satisfactory how these drugs do affect the kidney output. There ought to be very considerable diffidence in using these substances, because they are by no means devoid of risk, and I would warn physicians against their use unless the patient is under skilled nursing observation.

The removal of fluid by the intestinal route is another means of reducing œdema, particularly by the use of strong purgatives—calomel, jalap and others, but particularly nowadays by the use of epsom salts, either by the mouth or by bowel introduction. It has to be noted that the too frequent use of cathartics may do positive harm, and the observer will soon realize whether bowel purgation is of any use. Diaphoresis is sometimes of very great use in getting rid of a large quantity of fluid, and hot baths, particularly electric heat baths, may be tried, but are sometimes debilitating and trying.

The administration of thyreoid gland on the assumption that it causes an increase in the metabolism and elimination of urea has been tried in the hands of some with success, but the dose must be small and the effect closely watched.

The diet in these cases may be a valuable adjunct, as it has been shown within recent years that an increase in the protein content of the diet, as in Epstein's diet, may assist in the elimination of fluid, particularly when associated with the restriction of the sodium chloride intake.

Finally, the actual removal of fluid may be necessary by some mechanical means. Thoracentesis, or tapping of the abdomen, may be indicated to relieve respiratory embarrassment, but I find that the most satisfactory way of relieving fluid by these means is making frank incisions in the lower extremities and fomenting those incisions. There is much less risk in doing this than inserting Southey's tubes or other means, and the penis and scrotum can quite easily be relieved by pricking with a suitable needle.

Chronic Nephritis without Œdema.

In chronic nephritis without œdema it is sometimes difficult to assess whether the kidneys are at fault or the cardio-vascular system, and in all cases one has to bear in mind that the fundamental principle in the treatment is to give as much relief and as much rest as possible to the heart and circulation as well as to the kidneys. As far as the actual kidney condition is concerned, it is quite obvious that to take as much weight off the kidney as possible is going to postpone ultimate disaster, which must eventually overtake the cardio-vascular system. The same rule holds good in regard to prophylaxis in this type of nephritis as has been laid down in nephritis with œdema. In short, there is no rule, and except where there

is definite evidence that infection has been a definite cause of a previous nephritis, the loose application of indiscriminate minor surgery is strongly to be deprecated.

Diet.—It is my habit in these cases to prescribe a diet which contains a limited amount of protein, and to avoid the irritation of the kidneys by too free prescription of meats. I allow one egg, one pint of milk and four ounces of meat daily, and restrict the amount of fluid to about three pints of fluid daily. The intake of sodium chloride should be restricted, but not so as to cause the patient either misery or discomfort. The milk diet is of some value, but has its limitations, and certain unnecessary food, such as alcohol, should be proscribed. For the relief of urgent symptoms, such as threatened cerebral hæmorrhage or cerebral œdema, bleeding to the extent of half a pint to a pint is of much value, but is purely a temporary expedient. The measures for removing fluid as practised in those cases of nephritis with œdema are strongly to be condemned, but free purgation is indicated when the patient is stuporose or comatose.

Drugs are of very little value, and the only one which I regard as worth prescribing, except for the relief of symptoms, is acid sodium phosphate. For the headaches, "Luminal" or some similar preparation is of value, and bromides may be useful. Morphine is of use in the terminal stages of the disease, but it has to be remembered that once morphine is used it has to be continued to the end.

For uræmia there is a multitude of counsels, and one of the best methods of preventing uræmia is by washing out the bowel or by magnesium sulphate injections given intramuscularly or intravenously. For the mental unrest and sleeplessness and the various phobias from which these unfortunate patients suffer, "Amytal" and its relations I have found extremely useful, but morphine is again the one drug on which one can certainly depend. Bleeding and lumbar puncture may be useful in odd cases, but as a rule they give temporary relief.

On the whole, the treatment of chronic nephritis is a very unsatisfactory and unpleasing proceeding. In many cases it has the effect of prolonging life; in most cases it has the effect of bringing comfort and hope to the sufferer, but a great deal more depends upon the acumen and humanity of the prescribing physician than on the whole armamentarium of the pharmacopœia.

EUSTACE RUSSELL, M.D., M.R.C.P. (Edin.),
Honorary Physician, Brisbane Hospital.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held in the Medical Society Hall, Albert Street, East Melbourne, on August 2, 1933, DR. W. G. D. UPJOHN, the President, in the chair.

A British Medical Association Prize.

The President presented to DR. THOMAS EDWARD LOWE, of the Melbourne Hospital, the prize given by the British Medical Association, London, for competition among the medical schools of the Empire other than those of the British Isles. The competition was open to senior students and newly qualified practitioners (within one year of passing their final examination), and the subject for 1932-1933 was: "Describe three cases of medical interest which have been under your care and for each case discuss differential diagnosis, ætiology, methods of prevention (where available), treatment and prognosis".

The President congratulated Dr. Lowe on having gained the distinction for himself and the Melbourne University Medical School, and hoped that it would be the precursor of other and greater distinctions and would be an inspiration to him to devote his life to the service of his profession and of the public.

Dr. Lowe responded.

Diabetes in Childhood.

DR. EWEN DOWNIE read a paper entitled: "Diabetes in Childhood" (see page 367). The paper was illustrated by lantern slides.

In opening the discussion, DR. J. W. GRIEVE thought it would be of interest to review the diabetic patients admitted to the Children's Hospital from September, 1920, to the present time. He divided these admissions into two series: (*a*) those of the pre-insulin, and (*b*) those of the insulin era.

The patients of the pre-insulin era, 1920 to 1923, consisted of nine patients, seven of whom had died in coma. The length of history of these patients had been apparently short: number 1, four days, number 2, ten days; and the remainder two or three weeks. Four of these patients had died within a few days of admission. Two had been dieted for some months before coma supervened, and one boy, aged one year and nine months on admission, had received treatment for three and a half years before coma terminated his illness. This boy received insulin during the latter period of his treatment and was the first patient to be treated by insulin at the hospital. The remaining two patients out of the nine in the pre-insulin era had been dieted for four and eight months respectively, but one could find no records of their further progress.

In the insulin era, from 1923 onwards, sixty-two patients were admitted. There were complete records of thirty-three; among these there were twelve deaths, and twenty-one patients were alive and receiving treatment. Twenty-nine records were incomplete, and the progress of these children could not be traced. Three patients had been treated over periods of seven years. One was a boy of five years at the commencement of his treatment and was now thirteen. His insulin in 1927 was ten units *per diem*, and in 1933 was eighty-eight units *per diem*. Another girl was aged three and a half years when treatment was commenced and was now ten and a half years old; her stabilization and maintenance presented great difficulties. The other patient had been transferred to a hospital for adults.

The youngest patient in this series was one year and four months old and was discharged to his own doctor in the country, and the youngest but one was two years and nine months old and was now doing quite well and was aged six years.

Dr. Grieve then, from the information obtained on reviewing this series and his own personal experiences, elaborated some of the points raised by Dr. Downie in his paper.

In regard to ætiology, one patient in the Children's Hospital series, a male, aged twelve years and nine months, had a definite thyreoid enlargement, exophthalmos *et cetera*. Infection at times precipitated the onset of the classical symptoms of diabetes.

In regard to onset, most patients were gradually affected over a period of a few weeks. Several had long periods of indefinite ill health twelve months or more, and in a few acute symptoms had arisen in a few days and the children were admitted in coma or in impending coma.

Referring to enuresis, Dr. Grieve indicated the importance of investigating children who presented enuresis for the first time.

In reference to lowered renal threshold, Dr. Grieve said that only one patient in the Children's Hospital series suggested a possible renal glycosuria, but the condition of renal glycosuria was not uncommon in childhood. Dr. Grieve indicated the necessity for following the progress of these patients.

Turning to transient glycosurias, Dr. Grieve said that many children presented transient glycosurias, and these were often associated with infections. The nervous factors also had to be considered, and Dr. Grieve instanced several young, unstable, nervous patients who presented glycosuria and whose curves suggested potential diabetes, but who, when followed for several years, seemed to progress normally and presented normal blood sugar curves.

Dr. Grieve strongly supported Dr. Downie in his remarks on the importance of early education of the parents, for without their cooperation extreme difficulties arose. He also indicated the necessity of the child adopting a

normal routine before discharge from hospital. Hypoglycæmia was often prevented by following this practice. He also indicated the great desirability of having a social service worker to investigate the home conditions.

Referring to insulin, Dr. Grieve said that the frequency of dosage was usually two or three *per diem*. The largest dose *per diem* over a length of time in the Children's Hospital series was 550 units *per diem*. The site of injection was important, for many children tended to use the same site over and over again, with resulting induration, possible abscess formation and defective absorption. Dr. Grieve instanced one example of *Bacillus welchii* infection.

Regarding insulin reactions, the most common manifestations of hypoglycæmia were drowsiness and change of temperament. The strange behaviour indicated by Dr. Downie occurred in a number, and one boy, during his reaction, climbed over the railing of the balcony and jumped on to the asphalt footpath many feet below. The onset of some of these reactions was extremely abrupt, with no apparent warning. The relation to exercise was a very definite one in some patients.

The blood sugar estimations in some children might be extremely low without any reaction occurring. The urine tests might be a very fallacious guide to the presence or absence of hypoglycæmia.

One child in the Children's Hospital series developed the symptoms of coma or impending coma at least thirteen times. The highest blood sugar in the series was 0·948 *per centum*. Dr. Grieve stated that the recognition of circulatory and renal failure in diabetic coma was extremely important, and the old methods of administering fluids by all routes should be emphasized.

Discussing diet, Dr. Grieve said that the modified line ration diet was used for many years at the Children's Hospital, but the present tendency was to use individual diets of high carbohydrate and low fat with the necessary protein requirements. The change from the high fat and low carbohydrate diet could be made with difficulty. It might mean a temporary increase of the amount of insulin, but as a rule the insulin requirements would subsequently be about the same as required on the low carbohydrate dietary.

Dr. Grieve, in conclusion, emphasized the value and importance of small accessory meals. These meals had reduced the number of insulin reactions very considerably.

DR. T. A. F. HEALE congratulated Dr. Downie on his excellent paper. The collection of a series of thirty-five cases of diabetes with onset before the age of twelve years was no mean feat, as diabetes was not a common disease in childhood.

Dr. Heale said that he wished again to emphasize the changed outlook for the diabetic child; he did this deliberately because there were still some physicians who were rather pessimistic about the future of the diabetic child. Before the introduction of insulin the outlook was hopeless, a diagnosis of *diabetes mellitus* carrying with it the certainty of death within two years. Today the diabetic child was not only living, but he was happy and healthy, with normal development, both physical and mental, and with stamina and resistance equal to that of the non-diabetic child. There was every reason for believing that this happy state would continue and that the diabetic child would live to an indefinite period. This optimism was, however, justified only if certain conditions were fulfilled. These conditions were that the diabetic child received prompt, adequate treatment and, above all, continued observation. It was hardly possible to overestimate the importance of continued observation. A great many of the tragedies one saw occurred amongst those diabetic children who were seen at very irregular intervals. An important part in the after-care of any diabetic could be played by a home visitor or "wandering diabetic nurse". A home visitor was attached to the diabetic clinic at the Melbourne Hospital, and one could say without any exaggeration that one would be lost without her. Dr. Heale said he had been so impressed with the valuable work accomplished by this home visitor that he thought a similar service should be available to any doctor who had the care of diabetic patients. The "wandering diabetic nurse" would, of course, only visit the patient at the doctor's request and cooperate with him in every possible way. Such a service was first suggested by Dr. Joslin, and there were now a number of these nurses available in the State of Massachusetts. The provision of a similar service in the State of Victoria could be recommended confidently to any philanthropically-minded citizen.

Dr. Heale then discussed the question of the diet. A diabetic child should be adequately nourished, but it was important to avoid over-nutrition. He was convinced that diabetic children did better on a diet containing a liberal amount of carbohydrate and a relatively low amount of fat. In infancy the diet prescribed should differ little, if at all, from that given to normal children. For older children he thought that a carbohydrate content between 100 grammes and 200 grammes daily could be accepted as a standard range. Occasionally one could go up to 250 grammes of carbohydrate with benefit. The range of fat might well be fixed between 50 and 100 grammes per day, the exact amount depending a good deal upon age and caloric requirements. Dr. Heale thought it was just about time one ceased calculating the ketogenic-antiketogenic (F.A./G.) ratio; it was of no importance in present day treatment; it was useful when one planned a diet to contain the least possible amount of carbohydrate with the maximum of fat. When one used diets containing liberal amounts of carbohydrate, the amount of fat prescribed would never approach the danger zone. Dr. Heale did not advocate diets which were high in both carbohydrate and fat. Such diets were often over-nutritious diets. Regarding the partition of the diet into meals, he was convinced of the value of small feeds between the main meals, and thought such a plan could well be adopted almost as a routine. These mid-meal feeds provided a more even distribution of food and allowed the children to lunch as so many other children did. Further, these morning teas, afternoon teas, and suppers were given at the hours when insulin shock not uncommonly developed, and so helped to forestall this.

Coming now to the question of insulin, Dr. Downie had stated that four of the children were not taking insulin. Dr. Heale felt that insulin should be the unbroken rule for diabetic children. True, some children went along all right without it, at least for a while, but almost always a breakdown came and insulin was then needed. It seemed preferable to forestall this breakdown by using insulin, even if only in small doses, from the moment of diagnosis.

Dr. Heale then discussed some points about insulin shock. It was quite common to find low levels of blood sugar unassociated with any symptoms of insulin shock. Dr. Heale mentioned one patient who was found to have a blood sugar of 0·03%, yet the patient appeared quite normal and denied any discomfort. This condition of latent hypoglycæmia might occur for a certain time each day over long periods, weeks or even months, insulin shock developing only on rare occasions. The condition was deserving of wider recognition. If one made it a practice to estimate the blood sugar at different times of day, it would not often be overlooked. Dr. Heale believed that latent hypoglycæmia was the basis of nearly all the attacks of severe insulin shock. Many symptoms of insulin shock had been described, and it was usually believed that, if an attack of insulin shock was not treated in the stage of mild symptoms, there was a grave risk of the onset of such severe manifestations as coma and convulsions. This rarely seemed to happen. Insulin shock was conveniently divided into two clinical types—a mild type in which the symptoms developed relatively gradually over a period of five to twenty minutes and which, even untreated, recovered almost invariably without any severe symptoms. The severe type of insulin shock developed quite abruptly as a rule; there was little or no warning and there was no opportunity for the patient or his people to institute treatment before the development of severe symptoms. The symptoms of this type of shock were predominantly nervous or psychic, such as marked emotional upsets, queer behaviour, "nightmares", convulsions and coma. Patients who developed such severe attacks of insulin shock were almost always

found on investigation to show a constant latent hypoglycæmia at that particular period of the day. Some trivial circumstances, a little extra exertion, for example, usually tipped the balance. The prognosis of insulin shock was good, treated or untreated, but the severe type of insulin shock was not a matter of indifference. Death came as a rule from wrong diagnosis and wrong treatment, for example, mistaking insulin coma for diabetic coma. The differential diagnosis was as a rule easy. Insulin coma developed suddenly (minutes); diabetic coma developed gradually (hours). The finding of sugar in the urine was not diagnostic of diabetic coma. The first sample of urine obtained from a patient in insulin coma might contain sugar, but a second sample would always be sugar-free. The first sample represented urine secreted over a period before the development of insulin shock and did not reflect the present status. The second sample represented urine passed after the development of insulin shock, and hence would necessarily be sugar-free. Failure to appreciate these points caused insulin shock to be treated as diabetic coma. If one had any doubt, one would try the therapeutic test; the intravenous injection of a small amount of glucose would bring about recovery in insulin shock in a very short time; it would have no such effect in diabetic coma. Delayed recovery in insulin shock following intravenous glucose therapy did occur, but was quite rare, and there were usually abundant other signs pointing to the true condition.

In conclusion, Dr. Heale stated that physicians owed a debt of gratitude to diabetic children, for these children had taught them much in the past and would teach them more in the future. They were, as Joslin put it: "explorers of uncharted seas".

DR. F. KINGSLEY NORRIS, in congratulating Dr. Downie, expressed his own indebtedness to Dr. Downie for his advice and help in nearly all his own (Dr. Norris's) patients suffering from diabetes. Dr. Norris said that he had never had any experience of a diabetic child who could be successfully treated without the help of insulin for any length of time. In one case insulin had been withheld for three or four months, but a respiratory infection occurred with metabolic upset, and insulin had to be given again. The routine care of patients after their initial stabilization was extremely important, and the early education of parents in the technique of the care of a diabetic child was also vital to a successful outcome. The outlook in the case of the child of intelligent parents was better than that in the case of parents who were either too dull or too careless to cooperate properly. With regard to the necessity for confining a child to bed in the early stages, in public hospital cases at all events, it was difficult to stabilize a child during the first week or two without confining him to bed. It was impossible to prevent the young child from going to other children's lockers and otherwise committing dietetic sins which could hardly be prevented if he were allowed to run about. Referring to the late results of diabetes in childhood, Dr. Norris said that in his experience diabetic cataract was not uncommon, and he had three patients under his care at present suffering from this condition. There was also a tendency for diabetic children under insulin treatment to develop gradually a higher renal threshold. This was difficult to explain, but might be the cause of serious and unexpected complications owing to the raised blood sugar not being suspected from the urinary sugar. With regard to the capacity for the kidney to retain sugar, it was interesting to reflect that glycosuria never occurred in nephritis. Another feature of the late treatment of diabetes in children was the extreme and sometimes unexplained fluctuation in insulin requirements which seemed to take place quite apart from any obvious disturbing cause, such as intercurrent illness *et cetera*.

DR. H. BOYD GRAHAM said that from the point of view of private patients in ordinary financial circumstances it was desirable to reduce the amount of insulin to the minimum necessary on account of cost. Some reduction in insulin could frequently be achieved by restricting the number of injections to two per day, and also by giving insulin at the optimum time before the meal, that was to say, the interval before the meal should be lengthened if possible even to one and a half or one and three-quarter hours. It was desirable to have a certain diagnosis made before commencing insulin treatment by means of a blood sugar curve and to have further blood sugar estimations made at intervals of from three to six months to guard against the raising of the renal threshold. Dr. Graham said that he had found the graphic method of recording the various factors in the dietetic *régime* very helpful in his own practice. The chart showing the insulin requirements, weight curve, diet, urine findings *et cetera* was kept by the mother and a duplicate by himself. He preferred to see diabetic patients at least once a month and whenever possible to arrange for the "naked weight" to be recorded to avoid discrepancies due to clothing. With regard to the proportion of fat in the diet, Dr. Graham said that this should usually be higher in cold weather or cold climates than in hot weather, but in any case not higher than 30% of a total caloric intake.

DR. J. F. WILKINSON, in congratulating Dr. Downie on his paper, said that he had been with Joslin in May, 1922, just before the introduction of insulin, and had been struck by the remarkable way in which he was prolonging the lives of his patients with a carefully balanced diet. Shortly after this, insulin was discovered in Toronto, and he (Dr. Wilkinson) arrived there in September and stayed for some weeks. Here he saw insulin being used clinically for the first time. A series of diabetic children such as Dr. Downie had described showed clearly what an amazing advance had been made in the treatment of this condition since the introduction of insulin and what an immense difference this remedy had made in the outlook for life and health of such children. There was now no reason why they should not go on into normal life. How long this could last they did not yet know. There was a source of worry in the arteriosclerotic condition which had been found to develop in some cases. He agreed with Dr. Downie that all children should be treated with insulin when indicated rather than carry on on a restricted, though reasonably stabilized, diet with probably lowered resistance. Dr. Wilkinson went on to discuss the theory of the action of insulin and suggested that it afforded a period of rest for a damaged pancreas in a way comparable to the mechanical rest which should be given to damaged joints, and resting the pancreas might lead to a better ultimate recovery. Dr. Wilkinson considered that insulin must be pushed to the limit of tolerance in order to achieve this optimum result. He agreed that hospital treatment should be as brief as possible. The onset of coma during treatment was usually due to some mistake or failure on the part of the attendants. A typical instance of this occurred in his own practice recently. The mother of a diabetic boy, acting without instructions, increased the patient's diet and reduced the insulin. The boy developed an acute abdominal crisis and was in an agony of pain, from which Dr. Wilkinson thought he would have died from the shock of the pain alone. He administered at once one-sixth of a grain of morphine, which gave relief, and with the administration of insulin the patient recovered. He thought that the fixing of the protein intake at between two and three grammes per kilogram was important. An adequate diet with not too much fat, the patient gaining sufficient weight, and with sufficient insulin to keep his urine sugar-free, were the desiderata of a satisfactory diabetic *régime*. Accurate records were valuable, but he agreed with Dr. Downie that it was unwise to apply fixed pre-arranged schemes, such as "line ration" schemes of diet, as better results were obtained by ordering the diet for each individual patient.

DR. W. W. LEMPRIÈRE said there had been a suggestion that the arteriosclerosis which occurred in diabetes was less the result of sugar than of a hypercholesterinæmia. Considering such a possibility, they were embarking on the uncharted sea of lipoid metabolism, and it was known that in certain cases of diabetes the liver was stuffed with fat and there was a definite lipæmia. This fitted in with Aschoff's views that arteriosclerosis had a relation to lipoid excess. It was possible that with the modern system of low fat diet there might be a lessened incidence of arteriosclerosis.

DR. A. P. DERHAM referred to the patient mentioned by Dr. Downie, a baby of eight months, in whom acute diabetic coma developed seven days after a severe fall on the head. This child had rapidly recovered on administration of large doses of insulin, and at the age of two years and four months was doing extremely well on about twenty-five units of insulin a day. Everything that Dr. Downie had said about the delicacy of stabilizing young children as compared with adults was illustrated dramatically by the history of this baby. So immediate was her reaction to every minute change in diet or *régime* that she might literally be said to be resting on a knife-edge of metabolic balance. It had been impossible to apply any preconceived idea of diabetic diet. It had been found necessary to feed her very much as a normal baby, reducing the fat intake somewhat below the average and giving sufficient insulin to cover the necessary carbohydrate. So delicate was the balance, that to diminish the diet even by one ounce of milk mixture daily would mean a loss of weight. To increase the sugar intake by so much as half a drachm might produce a strong positive reaction in the urine. A small increase in the amount of egg yolk would lead to the presence of acetone in the urine and even a general malaise suggesting a commencing ketosis. A little carelessness in the use of the insulin syringe or a little more exercise than usual might precipitate a hypoglycæmic reaction, sometimes very severe. In spite of these difficulties, this baby was well and happy and living a normal life, and it was remarkable that on the diet which her metabolism seemed to demand, she tended to gain weight rather more rapidly than a normal child.

In reply, Dr. Downie said that in the patients described by Dr. Grieve, who showed a low blood sugar without clinical signs of hypoglycæmia, the phenomenon might be due to the fact that a fall in plasma sugar and corpuscular sugar did not necessarily occur on parallel lines.

Dr. Downie considered that Joslin's system of visiting nurses for diabetic patients was excellent, and a similar arrangement was very desirable in Victoria. In common with other speakers, Dr. Downie was unable to explain the absence of glycosuria in nephritis. With regard to the gradual rising of the renal threshold which sometimes occurred in diabetic patients, he was of opinion that this occurred more commonly when the metabolic balance had been unstable for a long period than in those in whom a successful balance had been maintained from the outset of treatment. In investigating the problem of the occurrence of arteriosclerosis in diabetic subjects, he had examined the ocular fundi of a series of patients with Dr. J. Ringland Anderson at the Alfred Hospital, and they had found that signs of arteriosclerosis were much more common in diabetic patients whose balance had been uncontrolled than in those in whom a correct balance had been maintained. Referring to the principles enunciated by Dr. Graham for the treatment of diabetic children in private practice, Dr. Downie said that fourteen of his own series were private patients, and he did not consider that it was justifiable to limit the daily supply of insulin for reasons of economy. He agreed with Dr. Wilkinson that insulin should not be stinted, but sufficient given to cover an adequate diet. He considered that Dr. Graham's suggestion that the interval for giving insulin could be lengthened to one and a half hours before meals was distinctly dangerous, because a little increase in exercise or some unexplained factor might cause a serious insulin reaction. In his own practice Dr. Downie said he had been forced in some cases to bring the insulin as close as ten minutes before meals. He thanked Dr. Wilkinson for his encouraging remarks. The possibility of a real improvement in sugar tolerance as a result of pancreatic rest by insulin was an interesting one, but it was difficult to assess such a recovery. The occurrence of acute pain in diabetic coma was not necessarily confined to the abdomen. Some attacks imitated pleurisy and others acute œsophagitis. He had no idea why the pain developed, but it seemed to be intimately bound up with the condition of ketosis. There was no reasonable basis, Dr. Downie continued, for under-nourishing diabetic patients, either adults or children. Referring to the lipoid theory of arteriosclerosis mentioned by Dr. Lemprière, Dr. Downie said that hypercholesterinæmia was not common in diabetes and did not bear any constant relationship to blood sugar. Patients with arteriosclerosis whom he had watched for some time had shown no evidence of hypercholesterinæmia, and in his experience the control of arteriosclerosis was that of the diabetic state and depended on the maintenance of a correct balance.

Referring to the patient described by Dr. Derham, Dr. Downie said that this infant was very interesting, as the child had required what was practically a normal diet for an infant of her age, and insulin had to be adjusted to meet these needs.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Nelson, Willa, M.B., B.S., 1930 (Univ. Sydney), Blayney.

Lloyd-Jones, John Richard, L.R.C.P. (Edinburgh), L.R.C.S. (Edinburgh), L.F.P.S. (Glasgow), 1890, 14, Castlereagh Street, Redfern.

Saxby, Noel Hunter West, M.B., B.S., 1930 (Univ. Sydney), Royal Hospital for Women, Paddington.

Obituary.

JOSEPH COOKE VERCO.

FEW men have shed greater lustre on Australian medicine than the late Joseph Cooke Verco, whose death was announced in this journal a week or two ago. Few men have been more respected by their colleagues than he, and few have been more admired. During the later years of his life, and even before this, he was by common consent looked on as the leader of the medical profession in South Australia. In many ways he had the rare quality of greatness, and he left an example worthy of the best traditions of medicine.

Joseph Cooke Verco was born at Fullarton, a suburb of Adelaide, on August 1, 1851. His parents were pioneer colonists who came to South Australia in 1839. He went to school at Mr. J. L. Young's Academy, a private school of good repute, conducted between the years 1862 and 1867 at Stephen's Place, on the east side, close to North Terrace. When he left school, Verco entered the civil service as a junior in the Railway Department. He soon found that the routine duties of a government department were not to his liking, and he turned his attention to medicine. He made up his mind to graduate in the University of London. But there were difficulties in the way. Matriculation at the University of London called for a knowledge of Greek, and this apparently had not been provided at Young's Academy. Nothing daunted, Verco went to Saint Peter's College, Adelaide, and, under the tutorship of the headmaster, the late Dr. G. H. Farr, he acquired a sufficient knowledge of Greek to pass his matriculation examination in 1870. The preliminary scientific examination in June, 1871, followed as a matter of course. His medical studies then commenced at Saint Bartholomew's Hospital. Here he won a senior scholarship in 1872, and in 1874 he obtained his first diploma as a member of the Royal College of Surgeons of England. He gained first place in forensic medicine and a gold medal of the University of London. He was also awarded a gold medal at the examination for the degree of Bachelor of Medicine in 1875. He held resident appointments at Saint Bartholomew's Hospital. In 1876 he was admitted to the degree of Doctor of Medicine of the University of London and was awarded a gold medal. In 1877 he obtained his last degree, Bachelor of Surgery, also with a gold medal. In the same year he was admitted to the fellowship of the Royal College of Surgeons of England.

At the time of his death he was about fifteenth on the roll of seniority of the college. This extraordinary record of success as a student and young graduate has seldom been equalled. A successful examinee is not always a successful practitioner, but Verco was both. With his knowledge he had insight and wisdom.

Verco returned to Australia as Surgeon-Superintendent of the barque *Clyde*. She carried 377 emigrants and reached her destination in South Australia after an eighty-seven days' run, which in those days was considered highly satisfactory. On May 29, 1878, Verco presented himself for registration by the Medical Board of South Australia. We have it on the authority of Dr. A. A. Lendon that Verco's number on the roll was 261, and that probably the only living practitioner senior to him and registered in South Australia is Dr. E. L. Archer, who is at present living in England. Dr. Archer was a fellow student of Verco at Saint Bartholomew's. Verco started in general practice at North Adelaide; he undertook every class of work. In 1878 all the medical men in Adelaide were general practitioners, and there was no differentiation even between physicians and surgeons at the Adelaide Hospital. Verco gradually extended his practice. He soon acquired a consulting room on North Terrace, and consultation work with other medical practitioners began to increase. In 1882 the honorary medical officers at the Adelaide Hospital were classified as physicians and surgeons, and Verco soon became an honorary physician, with the curious privilege of being allowed to operate upon patients with hydatid of the thorax. About the same time he was elected as an honorary medical officer of the newly founded Children's Hospital.

In 1885 the Medical School at the University of Adelaide was founded. At first provision was made for a two years' course only. Towards the end of 1886, when sufficient funds became available, a complete five years' course of study was arranged, and a full staff of lecturers was appointed. The late Davies Thomas and Verco were appointed joint lecturers in medicine; they commenced their teaching in 1887. Of those who were appointed to the staff of the new medical school, the four survivors are Sir William Bragg, Emeritus Professor Watson, Dr. A. A. Lendon and Dr. Anstey Giles. In 1888 or thereabouts Verco became sole lecturer in medicine, and he retained the position till 1915. He was a clinical lecturer at the Adelaide Hospital until he resigned in 1912. As a teacher Verco will be remembered with gratitude by a long succession of students; he was one of the teachers whom students always remember. He became "Uncle Joe" to them, and retained this title to the end. His teaching was characterized by clarity and insight.

In 1885 Verco was appointed Chief Medical Officer of the South Australian Branch of the Australian Mutual Provident Society, an important post which he held until his retirement from practice.

In 1887 the first Intercolonial Medical Congress of Australasia was held at Adelaide during the month of September. Some difficulty was experienced in the selection of a president. The choice ultimately fell on Verco, a unique distinction for a man only thirty-six years of age, who had been in practice for barely nine years. A better selection could not have been made. His inaugural address impressed both the members of the medical profession and those outside its ranks. He discharged the social duties attached to the position in an able yet unostentatious manner. It has been said with truth that from the time of his presidency of the congress his reputation became Australasian rather than merely South Australian. It was unfortunate that at the time of the delivery of his president's address he was suffering from the early stages of an attack of enteric fever, which made it necessary for him to relinquish work for some seven or eight months.

At about Easter time, 1888, Verco resumed his practice and carried it on without interruption for some thirty years. In 1890 he found it necessary to retire from his position at the Children's Hospital. He did not lose interest in the institution, and in 1898 he was appointed a vice-president. In 1896 he qualified by a pecuniary gift for the position of life governor; later he endowed a cot at the hospital, and, incidentally, another at the Queen Victoria Convalescent Home. When, at Christmas, 1891, a nephew, Dr. W. A. Verco, who had taken his degree the year before, was ready to start practice, his uncle transferred to him the local practice at North Adelaide and took up his permanent residence on North Terrace. He soon relinquished midwifery practice, and a few years later declined all operative surgery. He was the first medical practitioner in Adelaide to confine his practice to that of a physician.

In 1912 Verco resigned from his position as Honorary Physician of the Adelaide Hospital and was appointed Honorary Consulting Physician. When war broke out in 1914, he offered to act as substitute at the hospital for one of the physicians who was serving abroad. He let nothing interfere with this work, and a pleasing recognition of his long and valuable service was the naming of a ward after him, an honour only once previously bestowed on a former member of the staff, Dr. Wyatt.

Verco was a foundation member in 1879 of the South Australian Branch of the British Medical Association; he was, before his death, the last survivor of those who formed the new Branch. He was president in 1886-1887 and again during the war he occupied the president's chair almost continuously. He contributed numerous papers, and as a debater in discussion he had few, if any, equals. For some years he was Chairman of the Trustees of the Medical Benevolent Association of South Australia. His most notable contribution to medical literature was an article on hydatid disease, in which he collaborated with Dr. E. C. Stirling. This article was published in Clifford Allbutt's "System of Medicine", and is a landmark in the history of hydatid disease. Another article by Verco on myxœdema was included in the first edition of Allbutt's "System". An important investigation was undertaken by him into the records of the Australian Mutual Provident Society, to ascertain the degree of "loading" necessary in pulmonary tuberculosis. He found that while wives, from having to nurse husbands suffering from consumption, were more liable to become infected, husbands, not having to attend closely their consumptive wives and being perhaps away from home all day, were far less liable to contract the disease from their wives and were entitled to a much more lenient and less permanent loading.

Apart from his teaching, Verco was closely identified with the life of the University of Adelaide. In 1889 he served as Dean of the Faculty of Medicine. At this time it was customary to hold the position for one year only; he held it again during the years 1920 and 1921. He was elected to the University Council first of all in 1895, but resigned in 1902; when he had more leisure he was again elected in 1919 and served till 1928. He examined every detail of the agenda paper with meticulous care, and his notes and comments were models of accuracy. Reliability was one of the features of his character. After the war the English Red Cross Society, out of gratitude for the tremendous help and sacrifices of the Australian Imperial Force, sent to Sir Ronald Munro Ferguson, the Governor-General, the sum of £150,000 to be distributed at his discretion. A sum of £25,000 was allotted to each State in the Commonwealth. Verco was consulted as to the distribution of the South Australian portion. He recommended that £15,000 should be devoted to the establishment of a dental hospital in connexion with the Adelaide Hospital and as an integral part of it, and in close relation to the University of Adelaide as the teaching body. Thus the Faculty of Dentistry came into being, and Verco was its first dean; he retained this position and bestowed an immense amount of work upon it from 1921 to 1928. The scientific magazine started at the University of Adelaide, *The Australian Journal of Experimental Biology and Medical Science*, edited at its inception by the late T. Brailsford Robertson, appealed to him so much that he endowed it with the sum of £5,000, that the continuance of its publication might be insured. The gift of £15,000 by the family of the late John Darling for the erection of the Darling Building at the University of Adelaide was owing entirely, so it is understood, to his suggestion.

When, as a result of certain representations made to the Government of South Australia, a knighthood was con-

ferred on Verco in 1919, the news was received with the greatest pleasure by the members of the medical profession. Not only they, but the general public, were enthusiastic in the recognition of his eminence in his profession.

As a votary of science Verco's specialty was conchology. Some of his early days were spent dredging in the Gulf, and he accumulated material which it would, he calculated, take him another lifetime to investigate. He had an honorary appointment in connexion with the Adelaide Museum, and a laboratory where he passed many hours classifying and describing his specimens. But he had a wider interest in, and a more profound knowledge of science than reference to his interest in conchology would suggest. For eighteen years he was President of the Royal Society of South Australia, and in his honour the Verco Medal was instituted. He presented the Society with a president's chair, beautifully carved and handsomely upholstered. He also made considerable monetary gifts to the Society.

No account of Verco's life would be complete without reference to his deep religious convictions. His religious views coloured his life and controlled his actions. He had a reserved nature which did not admit many to his friendship, but he was invariably kind and more than courteous when he was approached. He had a generous mind and could recognize merit. His name will go down to posterity as that of a trusty leader, a wise physician, and an exemplar of the virtues that make a man.

Dr. F. S. Hone writes:

Few people outside South Australia can realize the extraordinary influence exerted by the late Sir Joseph Verco on the medical school of Adelaide and medical thought in the State. The nature of the man and the circumstances combined to make this influence exceptional. For the same reasons it is unlikely ever to be equalled. He grew up with the medical school from its infancy; its existence fostered the development of his powers and reputation; in his turn he nourished the school by his work, his counsel, and financial assistance. For almost the first thirty years of the school's existence he was lecturer in medicine and senior physician at the Adelaide Hospital and, owing to the relatively small number of students, he came into close individual contact with every student. Since he retired from active teaching practically all the clinical teachers have either been his students or had come under his influence in the formative period of their careers.

With the early generations of medical students he enjoyed an unusual prestige because of his academic record as a student and the fact that he had been President of the first Australasian Medical Congress in 1887. The story of his going through that congress with ambulatory typhoid fever and his subsequent grave relapse added a dramatic touch; the consistently high standard of his own clinical work and of his expectations from students filled us with respect, almost amounting to awe, and we were all proud of the lustre brought to our young school by his selection, in collaboration with E. C. Stirling, to contribute the article on hydatid disease to the first edition of Allbutt's "System of Medicine".

In those days he thought of little beyond his work. His life was indeed an "ordered life". His brougham and coachman were as well known as himself; we could almost set our watches by its departure from his house at 8 a.m.; punctually at 8.30 on two mornings a week he would arrive at his wards, starting with male and female on alternate days; at 11.30 he would return to his rooms; at 5 p.m. he would lecture. At the hospital he would greet his resident with punctilious courtesy, but little conversation would take place, except in relation to patients. It was a familiar sight to see him crossing the courtyard from one of his wards to another, with eyes bent on the ground, deep in thought, or perhaps speaking about a patient to his resident, but with no thought for anything outside. At the time of the hospital trouble in 1896, when a certain ward's name appeared frequently in the public Press, a delightful story went the rounds that he asked his house physician one morning: "Where is such and such a ward?" and received the reply: "You pass it each morning, Sir, in the corridor on your way to your ward." Twenty years later, with his wide and varied interests, even the invention of such a story would have been inconceivable.

His reputation for severity made his clerks and students work as they did for no one else, and was of untold good in establishing traditions for the young medical school. But everyone paid tribute to his scrupulous fairness and justice. They delighted in repeating his *bons mots*, his humorous or semi-scathing remarks at their expense, and those of us who summoned up courage to approach him with our personal difficulties or plans, found him, as did all subsequent generations of students, a wise counsellor and friend. Stories were already being told by his colleagues of the dramatic surprises he provided in consultations, and these multiplied as years went on. I remember one medical man telling me how, about 1900, he asked Dr. Verco to see in consultation a young child, whom he thought to be suffering from rheumatic fever involving the hip joint. After the history and appearances had been narrated in the anteroom, Dr. Verco calmly announced without leaving his chair: "The child is suffering from infantile scurvy and has been fed on such and such a food only." And the practitioner gasped: "How did you know?"

After the clinical school reopened in the early years of the present century, he took much more interest in the general welfare of the school and the students. He became President of the Medical Students' Society, reorganized it, continued in that office till 1914 and gave the school a vitality and standing that it has never since lost. It was here that the general mass of the students became acquainted with his human qualities and his wide sympathies, and added affection to their previous reverence. It was then, I think, that he first became known as "Uncle Joe", and even after his knighthood, his old students, in familiar conversation, never talked of him under any other name. His work for the school on the University Council and in subsequent years as Dean of the Medical Faculty, his resumption during the war of duty as acting honorary physician for several years, and of the presidency of the South Australian Branch of the British Medical Association for five successive years, "so as to spare other men", his labours with the Red Cross, and in coordinating the duties of civilian medical practitioners for work in different hospitals continually added to our admiration and affection. The amount of work he got through in those years was prodigious, yet he never seemed to tire or lose his serenity. When I heard in 1915 he was resigning the lectureship in medicine, and humbly remonstrated with him, on the ground that the school would never be the same, and he replied that by 5 o'clock, when his lecture was due, he was feeling too tired, I was thunderstruck. We had never thought of this as possible. Yet several years later he told me that, although he had retired in order to have more leisure, he was working harder than ever. For, in the meantime, he had secured money for a dental hospital for Adelaide, had taken an active part in the erection of that and the Darling Building, had created the dental school and become Dean of the Dental Faculty, Chairman of the Advisory Committee under the *Hospitals Amendment Act* in 1922, Curator of the Conchological Section at the Museum, and taken on a few other offices. That our admiration was shared by the general public was shown by the universal acclamation on his receiving his knighthood—the first of our profession in this State to be awarded it for purely medical and scientific services. And it was interesting in these later years to see how high dignitaries outside our profession deferred to his opinion. So respected was his judgement that if he was in favour of a plan, it was carried and, best testimony of all, no one cavilled at this procedure. In any plan he put forward there was never a suggestion of self-seeking; personal feelings were absent; all he thought of was the good of the cause. We have only realized the value of his leadership since he went into complete retirement.

I think that one of the chief secrets of his ever-increasing influence was his thoroughness in everything he did. He was first and foremost a clinician. To see him examine a patient was an object lesson. And he expected the same thoroughness from his students. From our first entrance into the wards he insisted on each of

us making a complete record of each patient to the best of our ability; on a definite diagnosis—I have ever been grateful for this piece of training—being put into words, with reasons for the faith that was in us. And then his meticulous care in his subsequent examination, the exactness of his physical signs, his clear and logical statement of the salient points in the differential diagnosis, and his final summing up remained as examples of how a patient's illness should be investigated. No method of examination was left unused.

I remember reading an address which he gave to the Medical Students' Society about 1910, in regard to methods of examination, which suggested by implication that a beneficent Providence had provided the mouth and rectum and other mucous membranes simply to enable a physician to make a more thorough examination than would otherwise be possible.

He early perfected himself in the use of the ophthalmoscope and laryngoscope; he was one of the first to instal an X ray diagnostic apparatus in his rooms; he was one of the earliest to use the binaural stethoscope, and one of the last to discard the supplementary use of the old wooden stethoscope. And one can visualize him now, gathering them up in his hands, at the end of his examination, standing at the foot of the bed and summing up the pros and cons.

This consistent thoroughness in the examination of every patient, however trivial their complaint, set up in his mind a lasting assurance that nothing had been missed. And it produced the same impression of confidence on the part of the patient, and laid the foundation of his unrivalled reputation. Coupled with his wonderful memory, his dispassionate marshalling of facts, his capacity for reflection and logical reasoning, it gave him the clinical acumen which sometimes seemed uncanny.

He had a singularly independent mind. Only a few years before his retirement I telephoned a request for a consultation and he asked me what I thought was the matter. When I said "malignant disease of the omentum, but I haven't found the primary focus", he replied: "Then I'll come down and prove it to be a tuberculous peritonitis." That illustrates his mental attitude—one source of his strength. He took nothing for granted; he affirmed nothing that he had not investigated. Soon after my graduation I was discussing some theoretical explanation of certain symptoms in a patient in whom I was interested, and he simply replied: "That is outside my experience." But once a thing had come within his experience, he was not satisfied until he had mastered it in every detail.

He carried the same thoroughness into all departments of his life. He was one of the earliest to institute a system of private case records. When his practice increased so that ordinary written notes took too much time, he learnt shorthand, and even after his retirement one could get from him a complete record of examination of patients he had seen over twenty years or more previously. When, in adult life, he took up conchology as a hobby, he speedily abandoned the old methods of gathering shells on the sea shore, hired a launch and went dredging for shells in the living state and revolutionized the study of conchology in South Australia. When he became dean of the faculty he gathered the history in detail of any proposal that came up, and one could be sure that any memorandum he prepared omitted no facts.

The same quality appeared in his addresses and lectures, and this, added to a lucidity of expression and a clear and forceful delivery, set his lectures in medicine in a class by themselves. I still get pleasure in turning to these old note books of nearly forty years ago, with their concise marshalling of facts, their complete description of symptoms and clinical signs, and enriched by little side notes from his own personal experiences. He had a peculiar aptness in coining phrases that fixed a picture in one's mind—and we all still quote aphorisms that he taught us as students. These turns of expression and his gift for humorous allusion made him a delightful speaker at any function.

His quiet, methodical ways and his deliberate manner of speaking produced an impression of stability rather than brilliance, yet one realizes that he never failed to rise to an occasion, however big it might be, and I still remember the impression created by an oration he delivered at a university commemoration in the early nineties. It was a literary masterpiece, delivered without a note and without a break, a feat I never heard repeated, except by Professor Wood Jones a few years ago on a similar occasion.

One never saw him flurried or hurried or upset by any emergency. A few years ago, when he sought advice for failing eyesight and his medical adviser told him with trepidation that he feared a sarcoma of the eye was present, he relieved the adviser's embarrassment by remarking: "In that case, the sooner it's removed the better", and at the operation he was said to be the calmest and most collected of all.

Underneath this and inspiring these qualities of thoroughness, integrity, devotion to duty and courage was a deep religious faith that remained in his later years as simple and sincere as in his youth. How much of his calm and serenity was due to this, none of us can tell. It induced a certain simplicity and austerity of life which mellowed with ripening years, yet which, coupled with his professional preeminence, set him, in a sense, apart. For that reason we were all doubly grateful to the gracious lady who brought to the second half of his life a companionship and comfort which were lacking in his earlier years. The memory remains of a great character, a great clinician, a great teacher, a great counsellor, and a great friend to us all.

Correspondence.

CLEFT PALATE AND HYPOSPADIAS: AGES FOR OPERATION.

SIR: It would seem that the old rule of operating on "the harelip at three months, and the palate at three years" is still followed. It is a pity, because from a speech point of view so much better results can be obtained by operating on the palate in very early infancy. A longer palate and a more flexible palate is undoubtedly obtained by early operation and, after all, the great aim of closing the cleft is to obtain a fully functional result, and it would seem obvious, even to a layman, that the muscles of the palate should be joined before the child begins to attempt speech, so that all its efforts in this direction may be conducted along the correct nerve paths, and that the proper muscles, instead of adventititious ones, should be trained from the start.

One sees, moreover, so many tragedies in which the palate operation has been missed altogether through some unforeseen circumstance intervening at three years preventing operation, which the parents would have been quite willing to have had done during the first three months of the child's life. To prevent these tragedies and to give these unfortunate babies the best chance in life I would plead for a reconsideration of the old rule, and strongly advocate operation as early as possible.

If the cleft is wide open in front and the upper jaw is wider than the lower (the opposite of what it should be) then a modified Brophy operation is absolutely essential to give a normal palate, and this operation can only be done at or under three months; thereafter the ossification of the maxillæ is too advanced for the bones to be bent. Again one sees hideous deformities in adolescents and adults through this very necessary operation having been omitted.

Hypospadias. Here the early establishment of correct muscular action is not involved and a certain amount of delay is desirable. In very early infancy the parts are too undeveloped for one to be able to work satisfactorily, and, moreover, it is difficult to keep the area clean. It is highly desirable, however, that operation should be undertaken before the child becomes conscious of any defect, and before the erectile tissue becomes too active. In my experience from two to three years of age is the most favourable time to select for operation. To operate too early courts failure and to delay till school age brings another kind of misfortune—apart from the obvious

disability—the boy's school-fellows soon become aware of the defect, and we all know what that means for the unfortunate boy.

Yours, etc.,

H. P. PICKERILL.

193, Macquarie St.,
Sydney,
Undated.

Books Received.

A TREATISE ON MATERIA MEDICA AND THERAPEUTICS, by the late R. Ghosh; Thirteenth Edition by B. N. Ghosh, F.R.F.P. & S.; 1933. Calcutta: Hilton and Company. Crown 8vo., pp. 727, with illustrations. Price: 12s. 6d. net.

THE TREATMENT OF DISEASES OF THE SKIN, by W. K. Sibley, M.A., M.D., B.C., M.R.C.P., M.R.C.S.; Fourth Edition; 1933. London: Edward Arnold and Company. Demy 8vo., pp. 231, with illustrations. Price: 10s. 6d. net.

THE CLINICAL STUDY AND TREATMENT OF SICK CHILDREN, by J. Thomson, M.D., LL.D., F.R.C.P.; Fifth Edition, rewritten and enlarged by L. Findlay, M.D., D.Sc., M.R.C.P., F.R.F.P.S.G.; 1933. Edinburgh: Oliver and Boyd. Demy 8vo., pp. 1109, with 344 illustrations. Price: 30s. net.

BLOOD DISEASES IN CLINICAL PRACTICE, by P. Morawitz, translated by A. Piney, M.D., M.R.C.P.; 1933. London: J. and A. Churchill. Demy 8vo., pp. 102, with illustrations. Price: 7s. 6d. net.

THE ANATOMY OF THE HUMAN SKELETON, by J. E. Frazer, D.Sc., F.R.C.S.; Third Edition; 1933. London: J. and A. Churchill. Demy 4to., pp. 300, with 219 illustrations. Price: 28s. net.

INTRACRANIAL TUMORS, by P. Bailey; 1933. London: Baillière, Tindall and Cox. Crown 4to., pp. 500, with illustrations. Price: 35s. net.

Diary for the Month.

SEPT. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 20.—Western Australian Branch, B.M.A.: Branch.
SEPT. 20.—Victorian Branch, B.M.A.: Clinical Meeting.
SEPT. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.
SEPT. 22.—Queensland Branch, B.M.A.: Council.
SEPT. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 27.—Victorian Branch, B.M.A.: Council.
SEPT. 28.—South Australian Branch, B.M.A.: Branch.
SEPT. 28.—New South Wales Branch, B.M.A.: Branch.
OCT. 3.—New South Wales Branch, B.M.A.: Council.
OCT. 4.—Western Australian Branch, B.M.A.: Council.
OCT. 4.—Victorian Branch, B.M.A.: Branch.
OCT. 5.—South Australian Branch, B.M.A.: Council.
OCT. 6.—Queensland Branch, B.M.A.: Branch.
OCT. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
OCT. 13.—Queensland Branch, B.M.A.: Council.
OCT. 17.—New South Wales Branch, B.M.A.: Ethics Committee.
OCT. 18.—Western Australian Branch, B.M.A.: Branch.
OCT. 18.—Victorian Branch, B.M.A.: Clinical Meeting.
OCT. 19.—New South Wales Branch, B.M.A.: Clinical Meeting.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser", page xvi.

CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

DEPARTMENT OF INSPECTOR-GENERAL OF HOSPITALS, ADELAIDE, SOUTH AUSTRALIA: Honorary Pathologist.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officers.

VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Resident Surgeons.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associated Friendly Societies' Medical Institute. Chillagoe Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their agreement to the Council before signing. Lower Burdekin District Hospital, Ayr.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Combined Friendly Societies, Clarendon and Kangarilla districts. All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor", THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

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